Research

CRISIL
An S&P Global Company

Assessment of Amine Industry

Balaji Speciality Chemicals Limited

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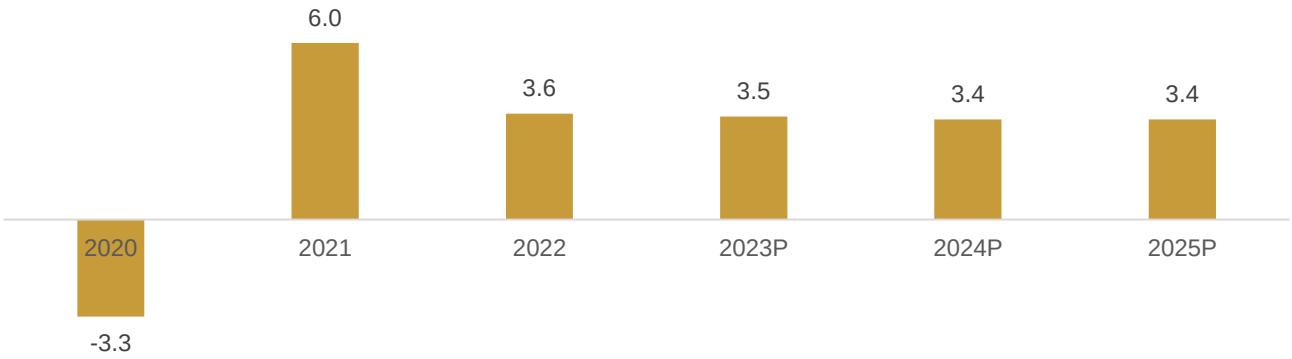
1 Global macroeconomic overview

Global gross domestic product (GDP) growth is projected at 3.6% for 2022. Beyond 2022, it is forecast to moderate to ~3.4% over the medium term

1.1 GDP outlook from 2022-2025

Figure 1: Expected global GDP growth rate (%)



P: Projected | Data for each calendar year

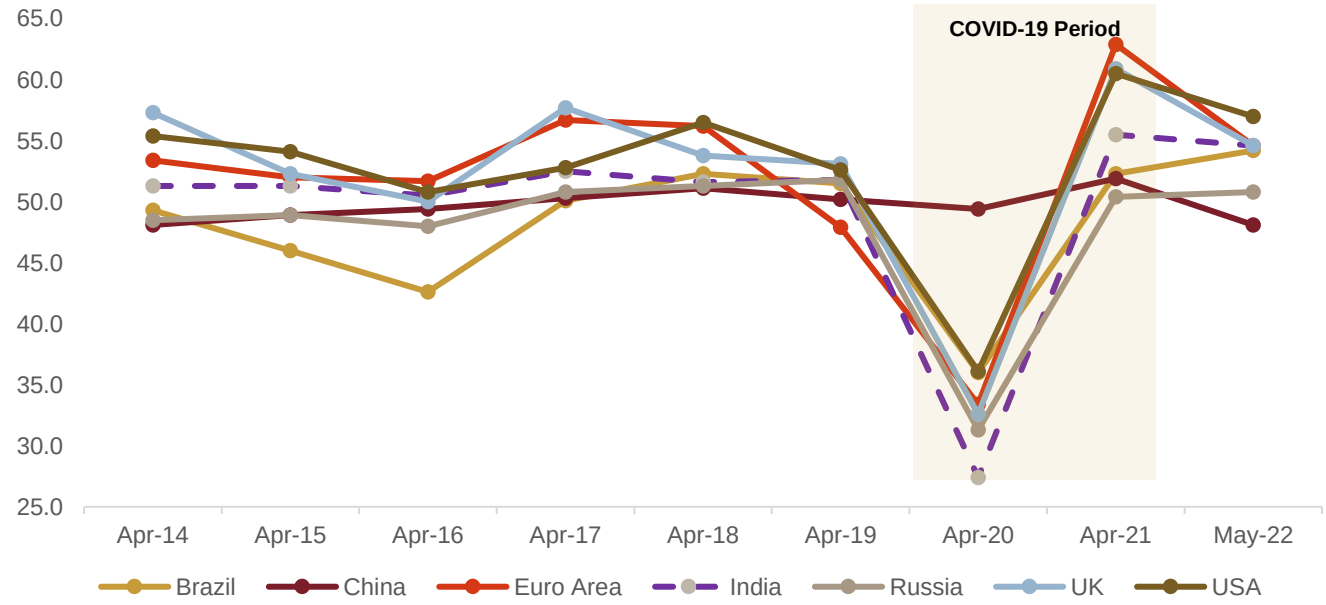
Source: S&P Global Economics, Oxford Economics

1.2 Impact of COVID-19 on the manufacturing sector

The volume of products and commodities in the upstream segment fell due to pandemic-led production and supply chain disruptions. Since the onset of COVID-19 more than two years ago, uncertainty has remained one of the few constants in the industrial sector. Manufacturers who demonstrated the relevance of data, trends, and the capacity to derive key insights have had the most success.

Manufacturing PMI numbers across geographies and sizes of economies have followed roughly similar patterns in the last few years. The index plummeted in the wake of the initial lockdowns across the world, and rebounded sharply even above pre-pandemic levels, as restrictions were relaxed and fiscal incentives to boost the economy became common place across all countries. PMI has since followed a pattern wherein the scare of each wave of COVID-19 cases has impacted it severely, with the trend moderating in the later months of 2021 and continuing into 2022, even in the wake of the Russia-Ukraine conflict.

Figure 2: Manufacturing PMIs

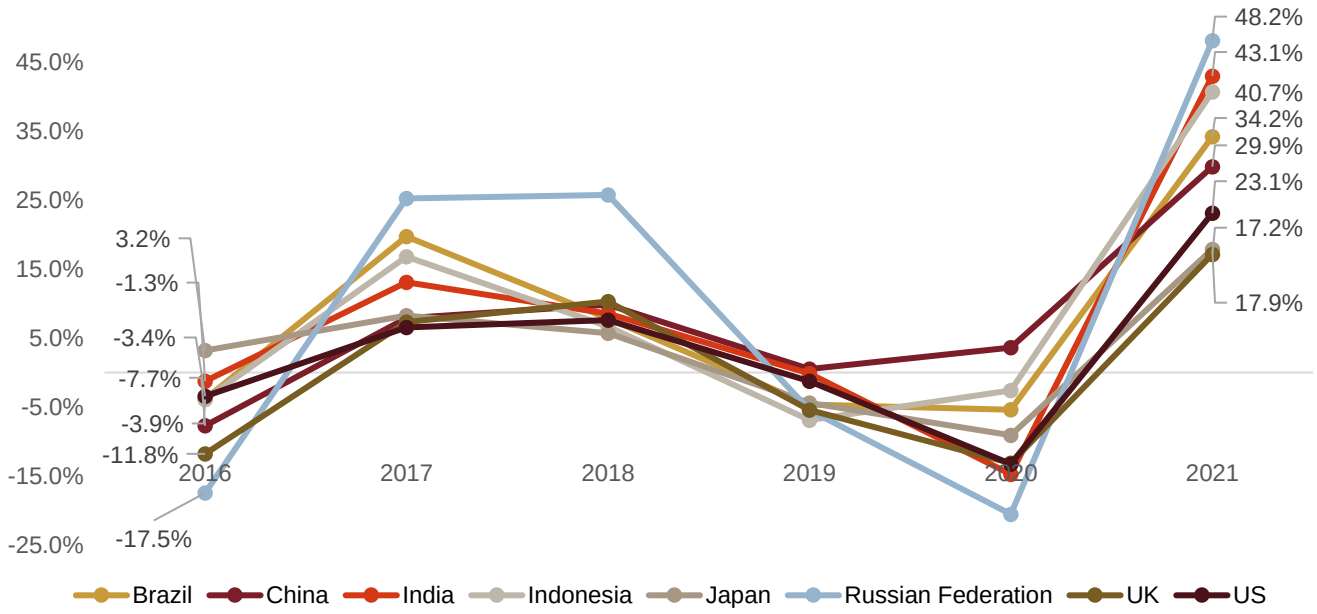


Source: S&P Global

The Indian manufacturing industry had a strong start to fiscal 2023, with significant and accelerated increases in new orders and production. Following a decline in March, international sales increased steadily. Meanwhile, rising commodity prices, the Russia-Ukraine war, and higher transportation costs aggravated inflationary pressures. India's PMI grew from 54.0 in March 2022 to 54.7 in April 2022 and remained largely unchanged at 54.6 in May 2022. It marked the 11th straight month of expansion in the manufacturing sector due to growth in output and orders, on the back of continued easing of pandemic restrictions.

Trade growth patterns for some key economies are represented below, highlighting very similar patterns for imports and exports.

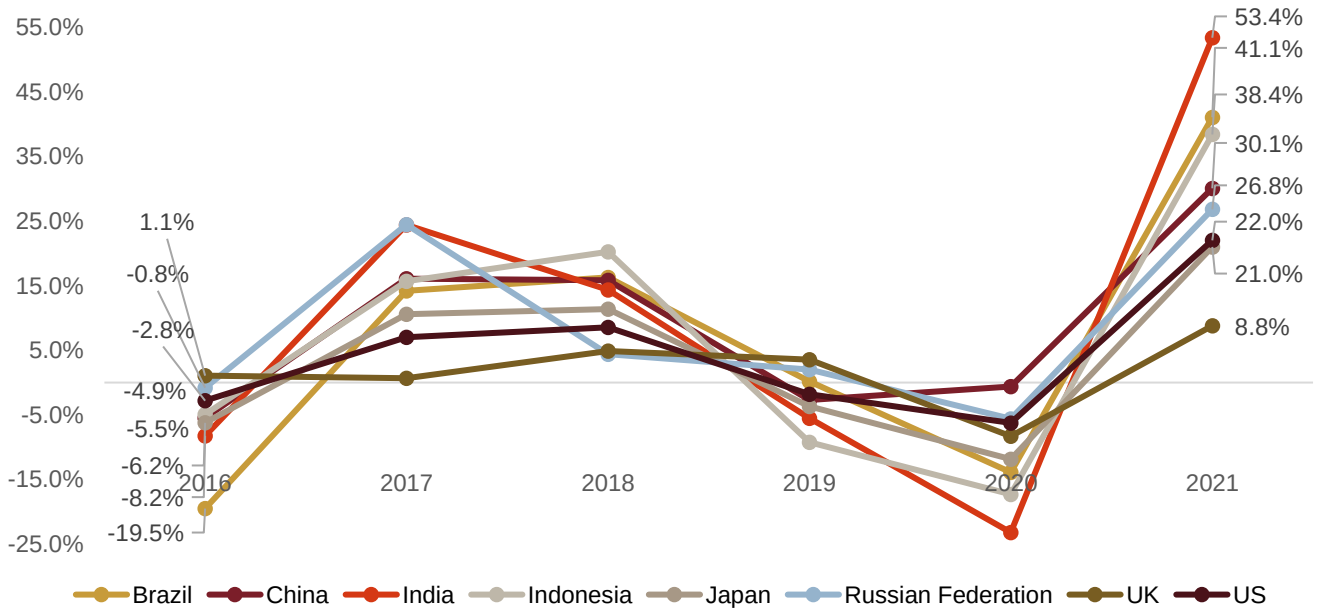
Figure 3: Annual growth (%) in exports



Source: UNCTAD

Note: Data for each calendar year

Figure 4: Annual growth (%) in imports



Source: UNCTAD

Note: Data for each calendar year

1.3 Changing outlook on manufacturing in China

China is the world's largest manufacturer in terms of output, and it earned the moniker ‘the world's factory’ shortly after joining the World Trade Organization (WTO) in 2001. Foreign firms and investors rushed to do business in the world's most populous country in the new millennium, drawn by cheap labour, With the recent pandemic, some companies have expressed concerns about manufacturing in China. The pandemic, which originated in Wuhan, disrupted supply chains and crippled business production all over the world. The trade war between the US and China has prompted many businesses to rethink their global supply chains. The pandemic sent shockwaves through many multinational corporations as they realized how much they relied on Chinese manufacturing — from raw materials to contract manufacturing to production facilities — causing many to seek alternative locations.

With nearly 36% market share, China has emerged as the most dominant player in the $4-trillion global chemicals industry over the past three decades. Lower labour costs, high subsidies (capital and export) and, most importantly, relaxed environmental standards have been the key drivers behind this unprecedented success. Many of these factors, however, have proven to be unsustainable in the long run. Aside from rising labour costs, China's cost advantage has been eroded by stricter pollution-control measures and the withdrawal of subsidies. The relocation of toxic manufacturing plants to dedicated industrial parks, and higher operational and capital costs have impacted the operations of Chinese chemical companies, causing significant supply-chain disruptions in the industry.

The 'China +1' diversification model is benefitting India structurally. A large pool of technically qualified manpower, strict adherence to global manufacturing standards and strong protection of intellectual property (IP) rights, in addition to labour cost advantages, have resulted in the rapid expansion of India's chemicals industry. Furthermore, the government's push for 'Make in India' in sectors such as pharma, automobiles, advanced chemistry cell, textiles and food processing will aid in increasing the size of the domestic end-user market, allowing manufacturers to benefit from economies of scale.

India to benefit from China’s downturn

The recent downturn in China’s speciality chemicals industry is an opportunity for Indian manufacturers, which have a cost advantage. The changing regulatory and policy landscape in China, reduced government support for Chinese manufacturers, geopolitical issues and the Covid-19 impact have prompted global companies to diversify their supply chains, thereby improving the export opportunity for Indian players. This is because, very few countries, other than India, have the requisite scale, technology (including complex chemistry capabilities), raw materials, skilled labour availability, IP protection and government support to capture this opportunity.

Table 1: Competitiveness of India vs China

Parameter	US/Europe	China	India
Labour cost			
Environmental compliance			
Plant capex			
Government policy support			

Parameter	US/Europe	China	India
Conduciveness of recent geopolitical landscape			

Note: Colour of the pie indicates relative advantage of a particular country/region vis-à-vis others in relation to a particular parameter. A fully coloured pie indicates maximum advantage compared with the other two regions.

Source: CRISIL Research

Several Indian companies are looking to set up global-sized plants to cater to growing domestic and global demand. The government is also supporting manufacturing in India. Initiatives such as Make in India, corporate tax reduction to 25%, and petroleum, chemicals, and petrochemicals investment regions (PCPIRs), are expected to create significant opportunities for manufacturers. This was reflected in India's Ease of Doing Business ranking improving to 63 in 2020 from 142 in 2014.

Due to its competitive advantage in multiple industries, favourable production characteristics, a favourable business environment and incentivizing government policies, India is expected to be the next best prospect to benefit from this changed position. Global macro tailwinds in some industries such as textiles, speciality chemicals, pharmaceuticals, metals and electronic manufacturing, along with sensible government reforms, are projected to set India on a sustainable economic path.

2 India macroeconomic overview

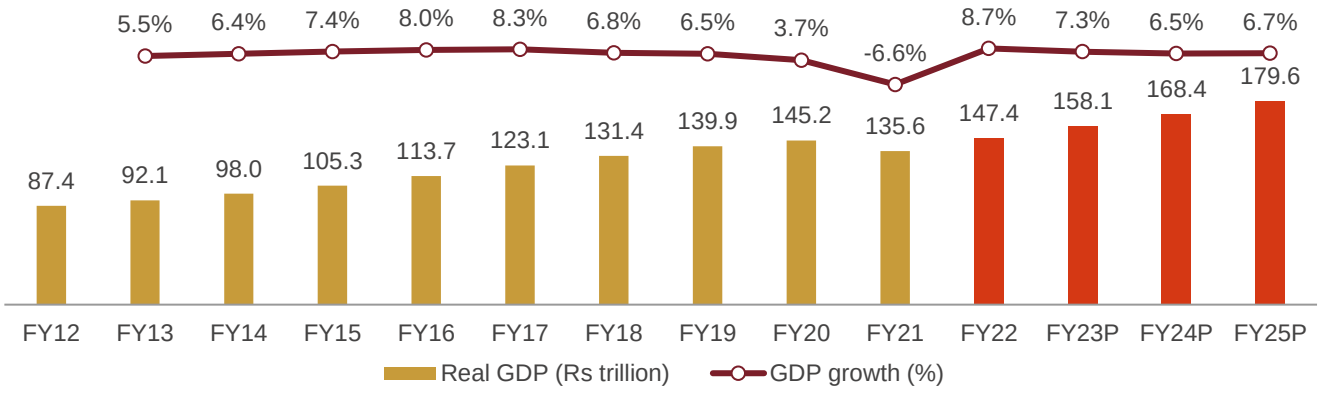
2.1 India to remain fastest growing economy despite GDP growth of 7.3% in fiscal 2023

As per the National Statistical Office (NSO) estimate released in January 2022, the country's real GDP shrunk a lower 6.6% in fiscal 2021. As per the second advance estimates released by the NSO, India's real GDP was set to grow 8.9% in fiscal 2022. However, the latest provisional estimates released by the NSO in May 2022 pegged the country's real GDP growth at 8.7% in fiscal 2022, a tad slower than the 8.9% according to the second advance estimates released in February 2022.

Though the economy is gradually picking up, the recovery has been uneven. With the third wave of Covid-19 (with minimal economic impact) behind us, the country is looking at fewer supply disruptions from Covid-19 and a fuller resumption of services activity in the coming fiscal.

But slower global growth and high commodity prices, especially of oil, could put downward pressure on economic growth. Heightened geopolitical risks from the Russia-Ukraine conflict, which continues to intensify, could add headwinds. For now, CRISIL maintains its real GDP growth projection for fiscal 2023 at 7.3%, with downside risks. Even with this cut, India will remain the fastest growing large economy.

Figure 5: India GDP outlook



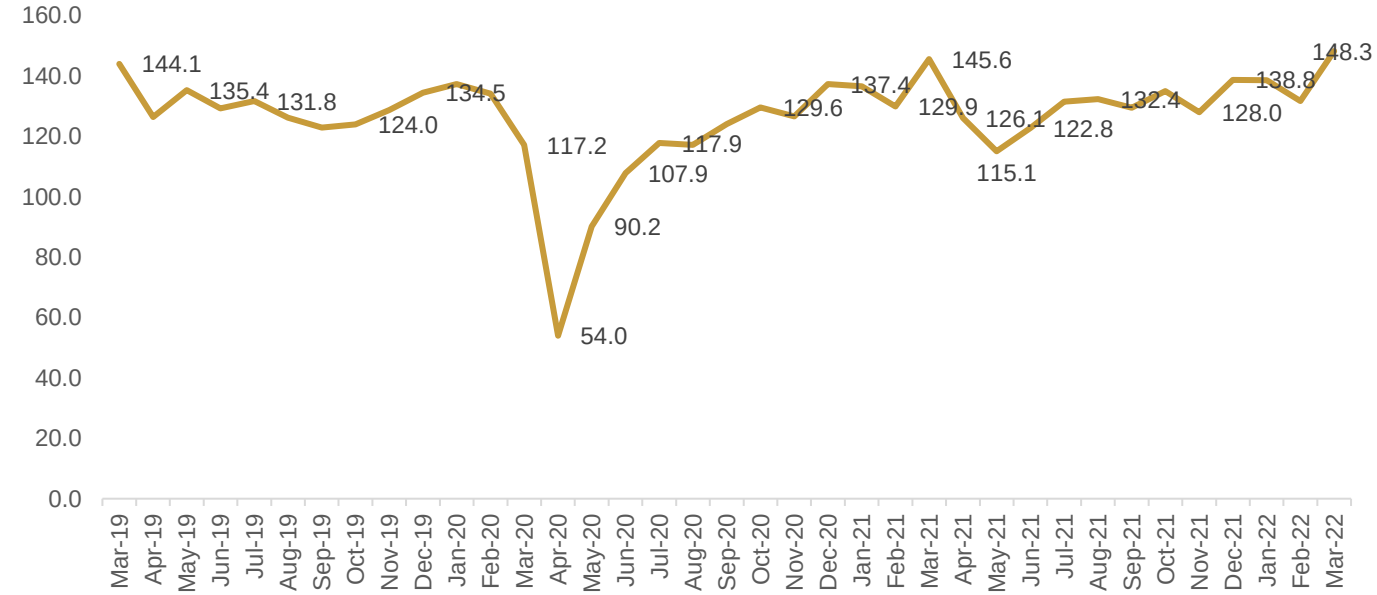
P: Projected

Source: CRISIL Research, Central Statistics Office (CSO), S&P Global Economics and Oxford Economics

2.2 Index of Industrial Production

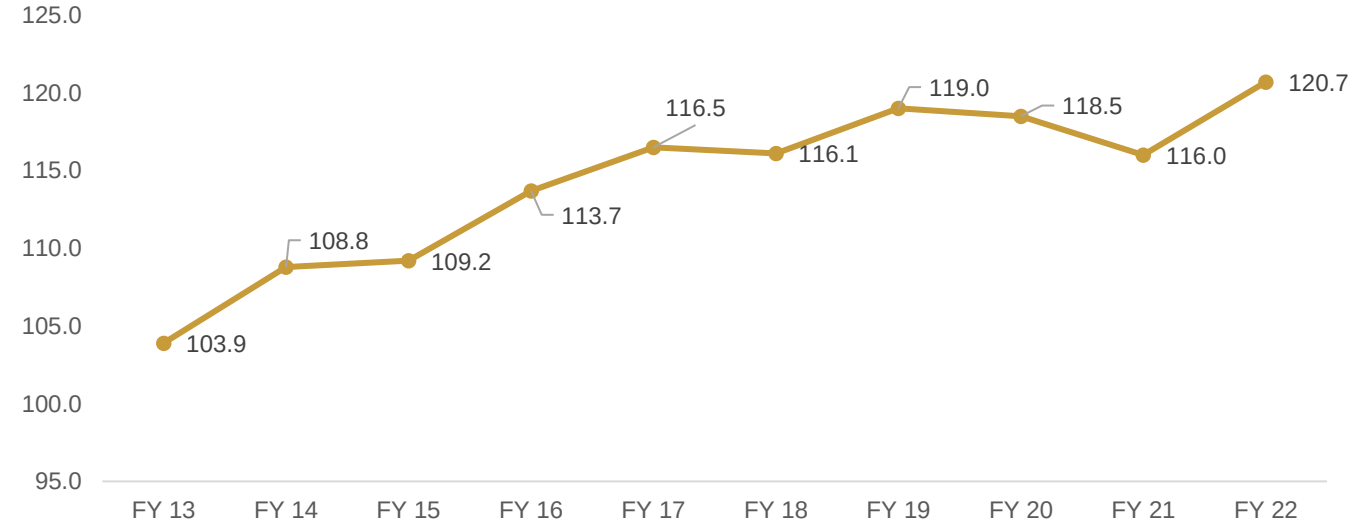
The pandemic's influence on the industrial sector is represented in a negative growth rate IIP of 8.4% in fiscal 2021. IIP surged 20% during April-October 2021, compared to a contraction of -17.3% in the corresponding period in the previous year. IIP witnessed a moderation in growth towards the end of fiscal 2022 - 1.9% growth in March 2022 (it had soared 24.2% in March 2021).

Figure 6: Value of IIP



Source: Ministry of Statistics & Programme Implementation

Figure 7: IIP (Manufacture of chemicals and chemical products)

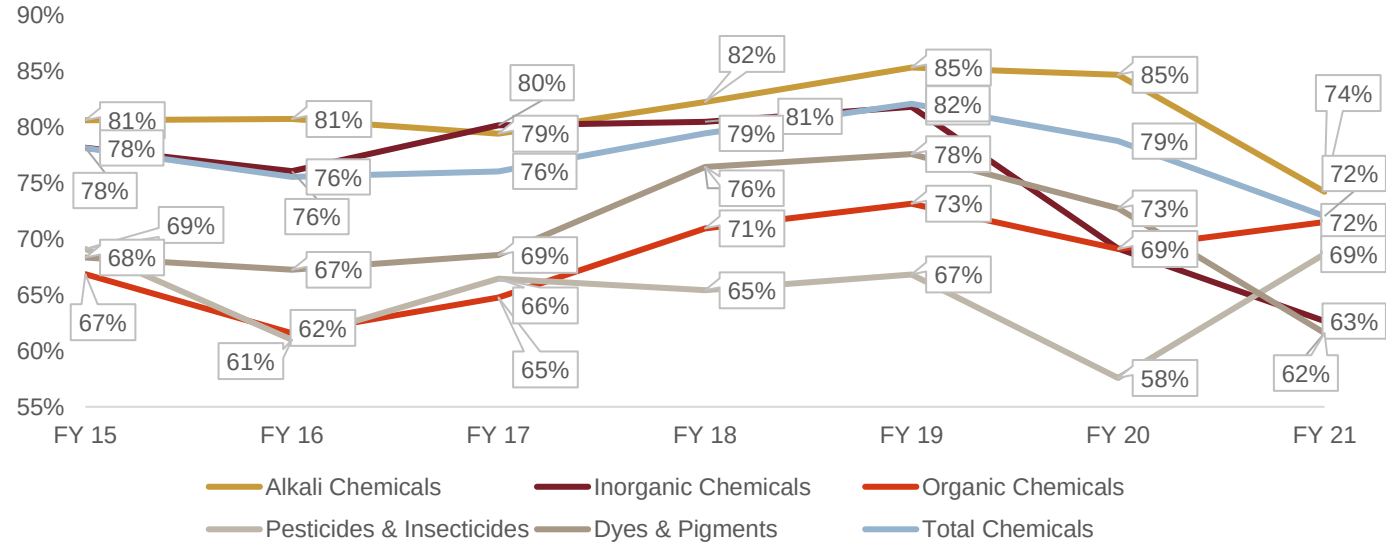


Source: Department of Chemicals and Petro-chemicals, Ministry of Chemicals and Fertilizers

2.3 Chemical sector in India is expected to grow 1.5x by 2025

India is the world's third-largest polymer consumer, fourth-largest producer of agrochemicals, and sixth-largest chemical manufacturer. India's chemicals industry accounts for 3.4% of worldwide chemicals production. The Indian chemicals industry was valued at $178 billion in 2019 and is expected to grow to $304 billion by 2025. The Indian chemicals sector is extremely diverse, with over 80,000 products and over 2 million people employed. The Indian chemical sector has a strong foundation for innovation because to a network of 200 national laboratories and 1,300 R&D centres. By 2025, India's chemical sector is estimated to contribute $300 billion to the country's GDP. India is the world's second-largest dye maker and exporter, accounting for 16% of global production.

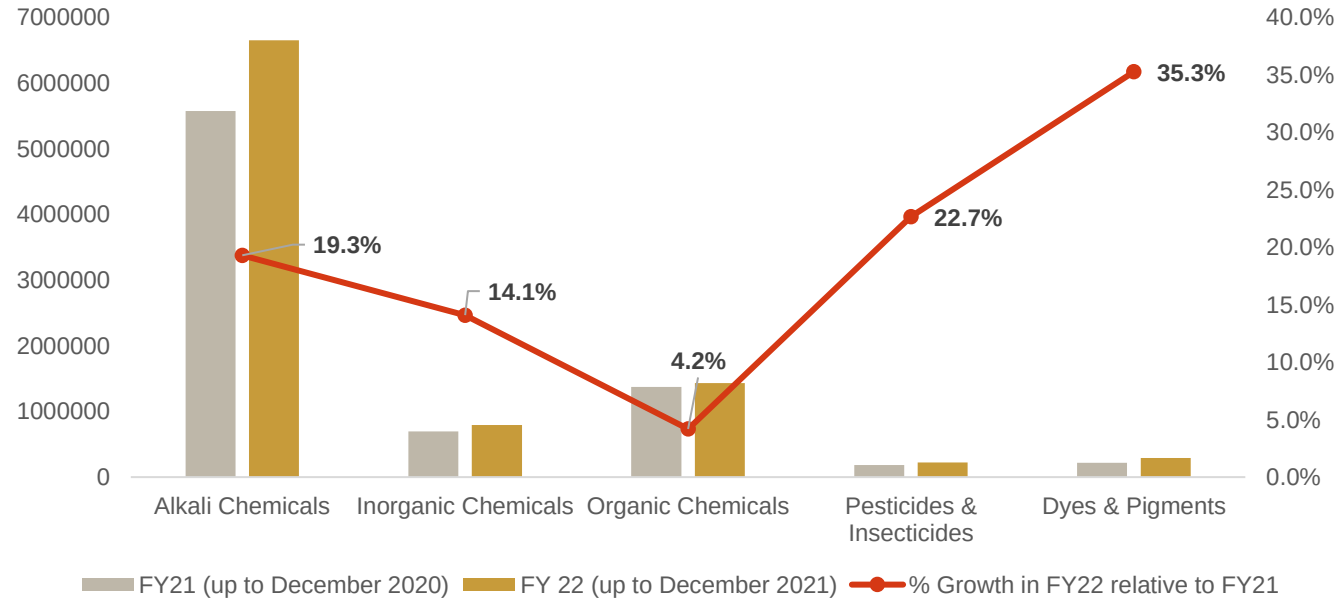
Figure 8: Capacity utilisation for major chemicals



Note: Based on MPRs received by the Department from manufacturers under large and medium scale units only

Source: Department of Chemicals and Petrochemicals

Figure 9: Production of major chemicals (in MT)



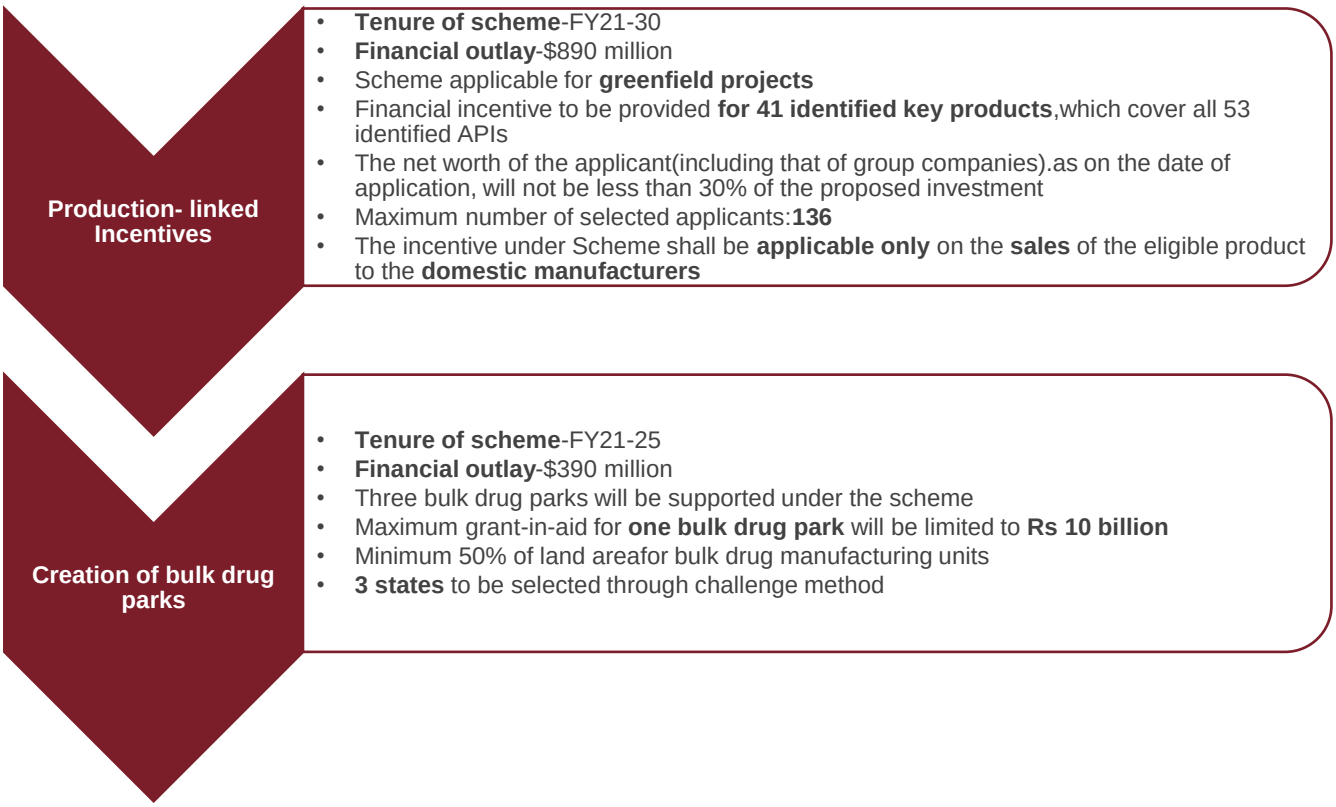
Note: Based on MPRs received by the Department from manufacturers under large and medium scale units only

Source: Department of Chemicals and Petrochemicals

2.4 PLI scheme

PLI scheme for active pharmaceutical ingredients (APIs)

The Union Cabinet, on March 21, 2020, approved the below schemes for the development of the Indian bulk drug sector.



Source: Government documents

The above-mentioned schemes are aimed at providing a regulatory boost to the sector by reducing the manufacturing cost of bulk drugs. With the newly announced schemes, the Indian government is also looking at creating common infrastructure facilities and reduce dependence on some critical drugs.

In addition, the 'China plus one' strategy, resulting in a number of multinationals undertaking proactive steps to reduce dependence on China for their manufacturing operations and looking at India as an alternative option, provides the opportunity for manufacturers in India.

PLI -2

The Government of India, in its notification in March 2021, extended the PLI to formulations as well as API, key starting materials covered under previous notification of production linked incentive scheme.

The objective of the scheme is to enhance India's manufacturing capabilities by increasing investment and production in the sector and contributing to product diversification to high value goods in the pharmaceutical sector. One of the further objectives of the scheme is to create global champions out of India who have the potential to grow in size and scale using cutting-edge technology and thereby penetrate the global value chains.

PLI scheme for chemicals

As the production of major chemicals has increased, a corresponding increase in export of chemicals was also observed relative to fiscal 2021, driven by pesticides and insecticides and dyes and pigments. However, this increase in exports was more than offset by an increase in imports, which was led by organic chemicals.

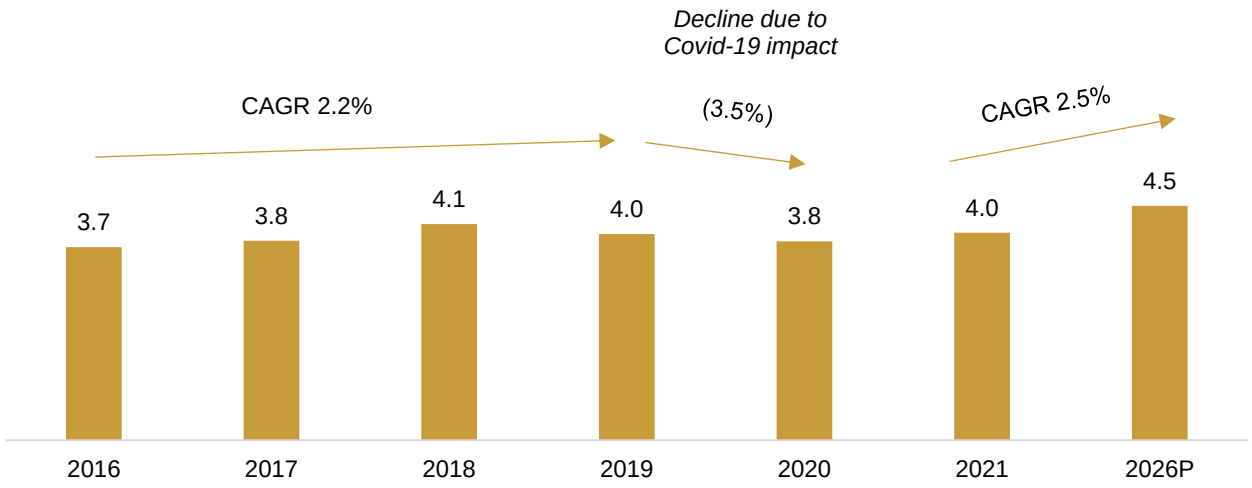
The Empowered Group of Secretaries (EGOS) meeting was held on July 31, 2020, to work out the details of the individual PLI schemes for the chemical sector. As per its directions, the Department of Chemicals and

Petrochemicals (DCPC) constituted a technical committee on August 17, 2020, to prepare the draft guidelines for the PLI scheme to promote domestic manufacturing of intermediates, bulk chemicals, and raw materials for agrochemicals, dyestuffs, and pharmaceuticals. The committee submitted its report on November 2, 2020. The DCPC has identified around 100 chemicals / intermediates imported in large value, and these chemicals are used in manufacturing the products having substantial export potential. These 100 chemicals are proposed to be supported under the PLI scheme for the chemical sector. The proposed PLI scheme aims at incentivizing domestic production of intermediates and raw materials for agrochemicals, dyestuffs, and pharmaceuticals with emphasis on domestic value addition. However, the PLI scheme for chemicals has not been considered yet.

In February 2022, the Minister for Chemicals and Fertilizers said the government is planning to announce a PLI scheme for the chemical sector to promote domestic production and exports and solve the trade deficit problem.

3 The Global Chemical and Specialty Chemical Industries

Figure 10: Global chemicals industry size ($ trillion)

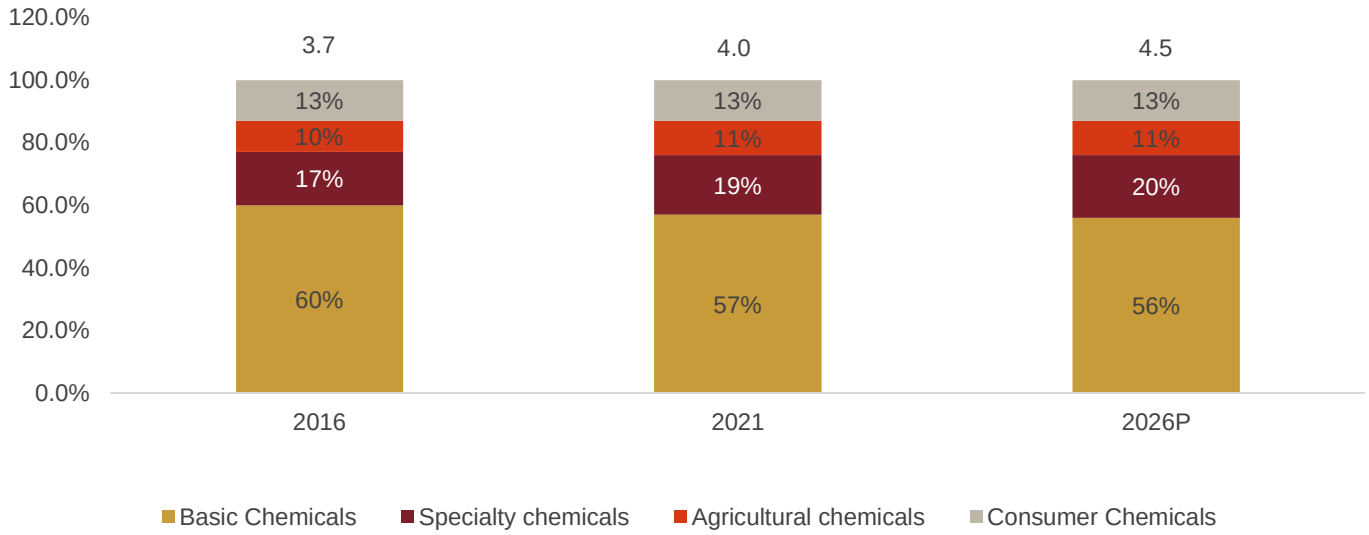


P: projected | Data for each calendar year

Note: Industry size excluding pharmaceuticals

Source: CRISIL Research

Figure 11: Global chemicals industry by segment ($ trillion)



P: projected | Data for each calendar year

Source: CRISIL Research

3.1 India's positioning in the global chemicals industry

As of 2020, the Indian chemicals industry has a ~3% share in the global chemicals industry. It is sixth at the global level and fourth in Asia. The country ranks eighth in global export of chemicals (excluding pharmaceutical products) and seventh in global import of chemicals (excluding pharmaceutical products).

Table 2: Chemical Exports

Exporters	Exports ($ bn)	Share in world exports (in %)		
Regions / countries	**2020**	**2005**	**2010**	**2020**
EU	1,036	50.0%	46.0%	47.4%
US	212	10.9%	11.2%	9.7%
China	169	3.2%	5.2%	7.7%
Switzerland	125	4.0%	4.3%	5.7%
Japan	79	4.8%	4.6%	3.6%
South Korea	74	2.5%	2.9%	3.4%
UK	66	5.2%	4.3%	3.0%
India	53	1.0%	1.4%	2.4%
Singapore	51	2.4%	2.3%	2.3%
Canada	36	2.4%	2.0%	1.7%
Above 10	**1,901**	**86.4%**	**84.1%**	**87.0%**

Source: World Trade Organization (WTO Statistical Review, 2021)

Table 3: Chemical imports

Exporters	Imports ($ bn)	Share in world imports (in %)		
Regions / countries	**2020**	**2005**	**2010**	**2020**
EU	834	41.4%	37.9%	36.2%
US	283	11.4%	10.1%	12.3%
China	212	6.7%	8.5%	9.2%
Japan	73	3.3%	3.5%	3.1%
UK	68	4.7%	4.0%	2.9%
Switzerland	57	2.3%	2.1%	2.5%
India	**53**	**1.2%**	**2.0%**	**2.3%**
South Korea	51	2.1%	2.3%	2.2%
Canada	50	2.8%	2.4%	2.2%
Mexico	43	2.1%	1.9%	1.8%
Above 10	**1,723**	**78.0%**	**74.7%**	**74.7%**

Source: World Trade Organization (WTO Statistical Review, 2021)

That said, the size of the Indian chemicals industry, excluding fertilizers and pharmaceuticals, was $115-120 billion in fiscal 2021. Including fertilizers and pharmaceuticals, it was $160-180 billion.

3.2 Global specialty chemicals market to log 4-5% CAGR by 2026

Within chemicals, specialty chemicals are a key segment, valued at $750-770 billion at the global level in 2021. The segment expanded at 3-4% CAGR over 2016-21.

Specialty chemicals are low volume, high-value chemicals with specific applications classified based on end-user industries. Some specialty chemicals are used in multiple industries.

Agrochemicals dominate the global specialty chemicals revenue pie, accounting for 8-10% share in 2021. The use of agrochemicals in fertilisers, herbicides, insecticides, and pesticides are rising because of increasing demand for agro products, led by population growth and improving propensity to buy owing to rapid industrialisation globally.

Global specialty chemicals industry classification (2021)

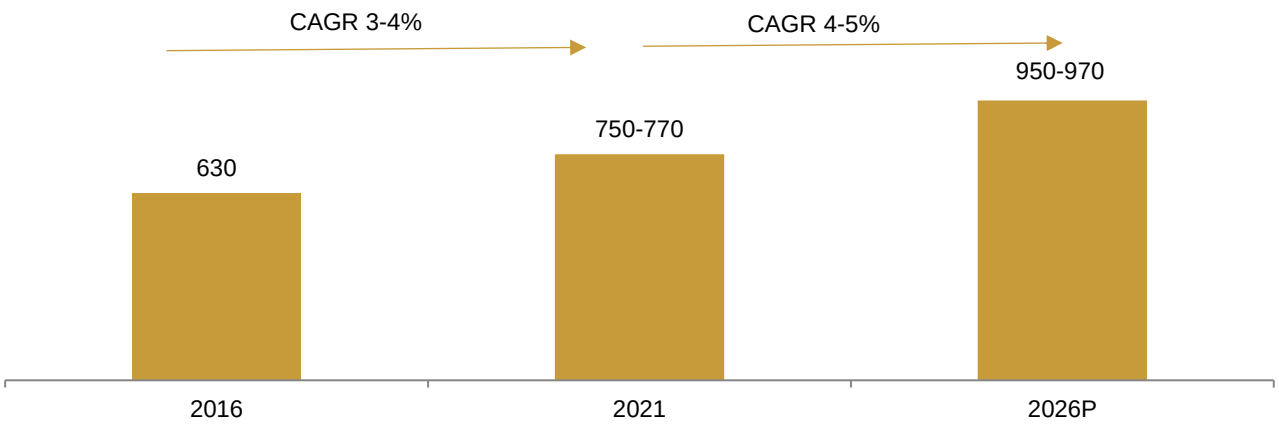
Specialty chemicals classification
Agrochemicals: 8-10% share of global market
Polymer and plastic additives
Construction chemicals
Electronic chemicals
Home and personal care chemicals: 6-7% share of global market
Performance chemicals (includes multiple sub segments): 8-10% share of global market
Pharma intermediates: 4-5% share of global market
Specialty coatings
Lubricant and oilfield chemicals
Textile chemicals
Food additives
Adhesives and sealants
Dyes and pigments
Others

Note: The performance chemical segment includes various sub-segments such as antioxidants, anti-wear additives, flotation agents, solvents, surfactants, emulsifier, solvents, and chemical intermediates

Source: CRISIL Research

In 2020, the global specialty chemicals space declined 3-4% on-year because of the fallout of Covid-19. However, the segment is estimated to have recovered in 2021. Between 2021 and 2026, the market is expected to grow at 4-5% CAGR to $950-970 billion.

Figure 12: Global specialty chemicals market size ($ billion)



P: projected

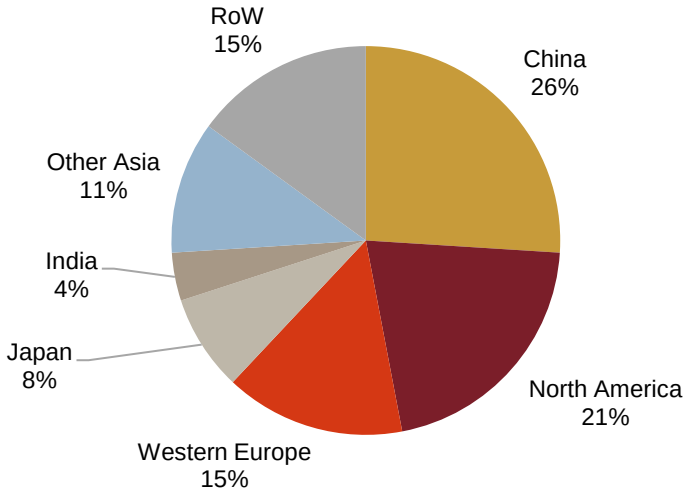
Source: CRISIL Research. Data for each calendar year

3.3 APAC – key contributor to global specialty chemicals market in 2021

Developed countries (particularly the US) and emerging countries in Asia-Pacific (APAC) have seen a significant shift in the specialty chemicals industry in the past two decades. This has mainly been due to stricter environmental norms in western countries, coupled with cost advantages enjoyed by companies in emerging markets in terms of logistics and labour. The shift is also because companies are relocating closer to demand centers and optimising their supply chains.

In 2021, APAC accounted for the majority of the global specialty chemicals market, with a share of 48-50%, followed by North America and Western Europe.

Figure 13: Market share of key countries in specialty chemicals in calendar year 2021

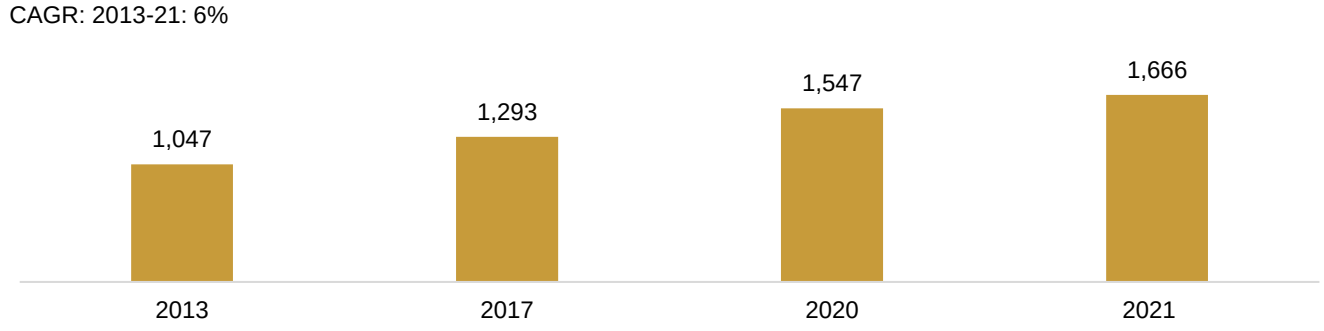


Note: CY – calendar year

Source: CRISIL Research

3.4 China's chemical industry performance

Figure 14: Growth of the Chinese chemical industry (EUR billion)



Source: CRISIL Research, Cefic (European Chemical Industry Council). Data for each calendar year

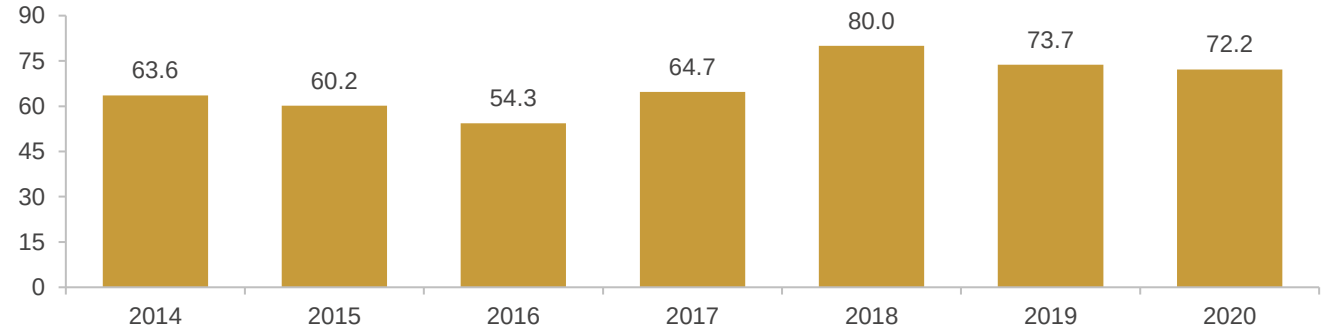
The Chinese chemical industry expanded at a CAGR of 6% during 2013-21. The industry is expected to witness a relatively slow CAGR of ~4% over 2021-26. Chemical demand growth is expected to taper in the consumer goods and electronics industries. Meanwhile, the automotive sector is expected to drive demand

3.5 China's specialty chemicals market is eroding

China's specialty chemicals market has been on a downtrend in recent years, primarily because of **environmental norms** introduced by the government, which have led to the closure of several chemical plants. The Chinese government started implementing stricter environmental protection norms from January 2015 to control pollution and imposing strict penalties on polluting industries, including chemicals.

As a result, capital and operating expenditure of chemical companies are rising, making the output less competitive in the export market. China's chemical exports have been on a downward trend since 2015. In 2017, ~40% of the chemical manufacturing capacity in China was temporarily shut down for safety inspections, with over 80,000 manufacturing units charged and fined for breaching emission limits. While exports rose in 2017 and 2018, as most plants restarted production, the trend has again turned south over the past two years. Domestic demand is also slowing because of slowing economic growth. China's economy is expected to grow at relatively slower pace in the coming years, resulting in reduced domestic demand.

Figure 15: Trend in China's chemical exports ($ billion)



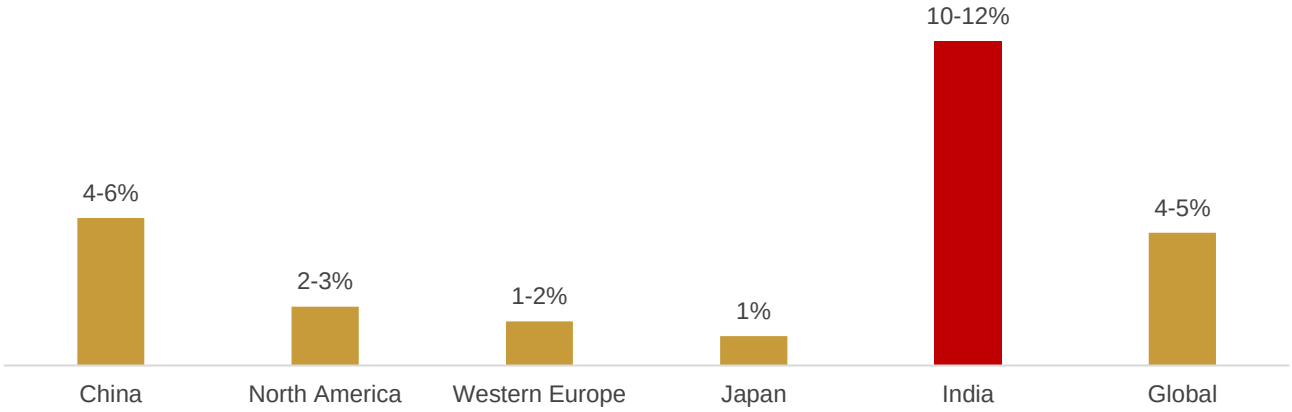
Note: Data for each calendar year

Source: UN Comtrade; export of goods under HS codes 28 and 29 considered

3.6 The Indian market is expected to grow sharply compared with other regions

By region-wise demand, India's specialty chemicals industry is expected to post 10-12% CAGR over 2021-26 owing to rising demand from end-user industries, along with tight global supply on account of stringent environmental norms in China. In contrast, markets such as Americas, Europe, and Japan are expected to clock less than 3% CAGR over the next five years because of industry saturation in these regions. China's specialty chemicals industry, which saw historic growth rates of ~20% and above until 2013 driven by the lower base effect while growth moderated going forward with sector exhibiting growth of CAGR of 9-10% over 2013-21. The sector is expected to witness relatively slow CAGR of 4-6% over 2021-26 owing to factors including implementation of government policies such as stringent environmental norms, changing global trade dynamics (China+1 strategy) and rising labour cost

Figure 16: Region-wise growth in specialty chemicals (2021-26, CAGR)

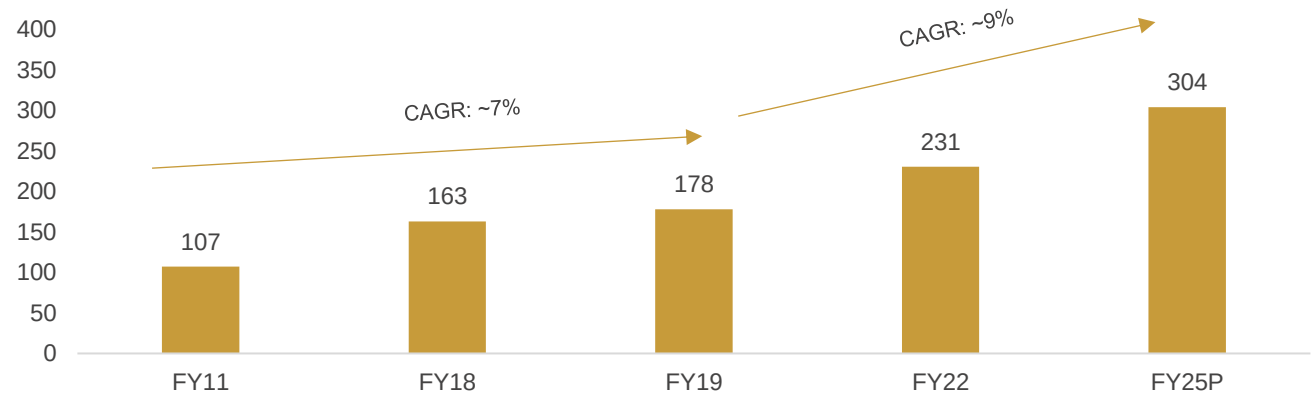


Source: CRISIL Research

4 Indian Chemical and Specialty Chemical Industries

4.1 Indian chemical industry

Figure 17: Indian chemical industry development ($ billion)



Note: Market size including (Biotech, Pharmaceuticals)

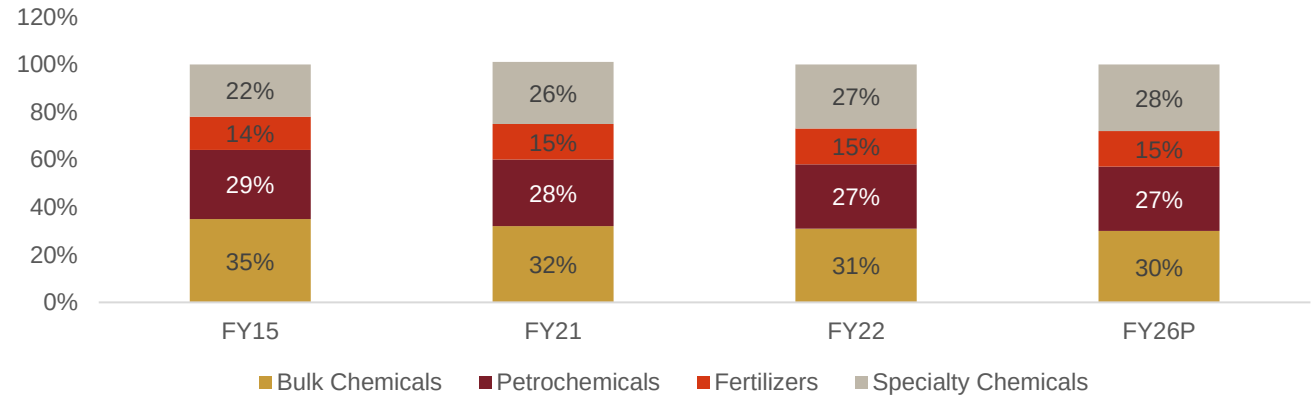
P: Projected

Source: Department of chemicals and petrochemicals

The Indian chemical industry is a key constituent of the Indian economy, accounting for 2.28% of the GVA (including pharmaceuticals) for all economic activities in fiscal 2020 compared with 2.23% in fiscal 2015. In 2020, it was ranked sixth in the world in terms of revenue (excluding pharmaceuticals) and accounted for 2.7% of the global chemical industry compared with 2.5% in fiscal 2010.

The Indian chemical industry is expected to double by fiscal 2025 at a CAGR of 9% over fiscals 2019-25.

Figure 18: Indian chemical industry by sub-segments



Note: Segments excluding Pharmaceuticals

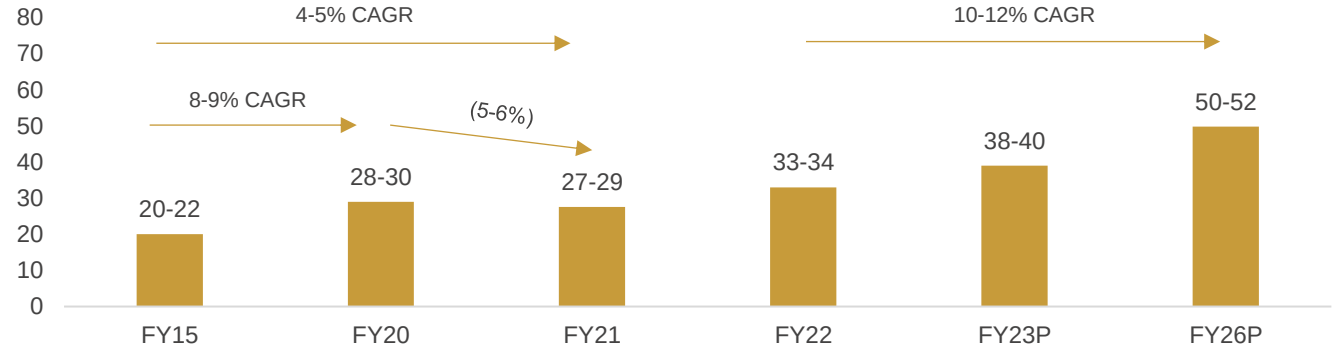
P: Projected

Source: CRISIL Research

4.2 Indian specialty chemical industry

The Indian specialty chemicals industry, accounting for ~26% of the overall chemicals industry (excluding pharmaceuticals), was $28-30 billion in fiscal 2020. The industry expanded at 8-9% CAGR over fiscals 2015-20, driven by an increase in domestic offtake from various end-user industries and rising exports. However, in fiscal 2021 the industry declined 5-6% on-year because of a slowdown in economic activity and the consequent decline in demand from end-user industries. The industry exhibited recovery in fiscal 2022 and is estimated between $33-34 billion. Indian specialty chemical industry is expected to reach $50-52 billion by fiscal 2026 growing at CAGR of 10-12% over the forecast period of 2022-2026.

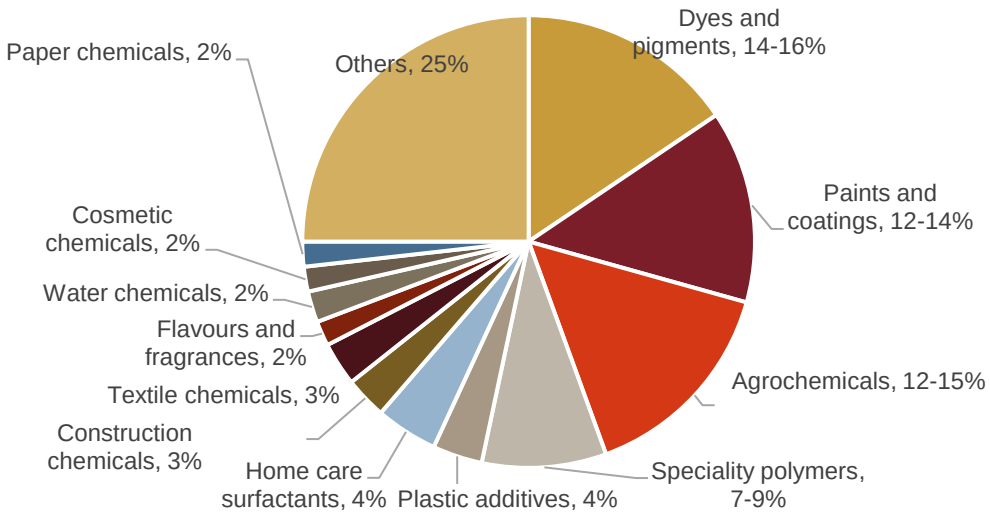
Figure 19: Indian specialty chemicals industry's trajectory ($ billion)



P: Projected

Source: CRISIL Research

Figure 20: Major sub-segments within the specialty chemicals market (value terms) in fiscal 2022



Source: CRISIL Research

Note: CRISIL Research considers personal care ingredients, polymer additives, water chemicals, textile chemicals, construction chemicals, surfactants, and flavours and fragrances as specialty chemical categories.

4.3 Favourable global factors

China, a major player in commodity chemicals, has seen reduced focus on specialty chemicals because of low volume and high value nature of the segment. Additionally, stricter environmental regulations introduced in 2015 have affected the output of its chemical manufacturing industry negatively. Going forward, these factors are expected to play out in favour of India's specialty chemicals industry, as exports will trend up over the next few years.

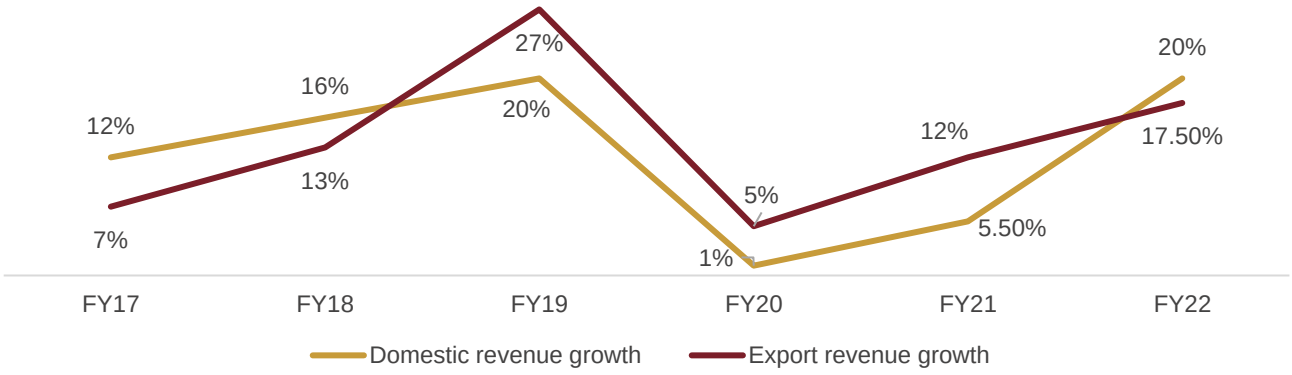
India is well-positioned to drive the specialty chemicals industry given its abundant supply of labour, land, feedstock, as well as an established legal and regulatory framework. Indian companies with strong safety, health and environment measures, strong R&D and project management, and integration are well-poised to leverage opportunities in this space. There are several players in the Indian specialty chemicals space, both organised and unorganised, each specialising in specific or diversified product segments.

4.4 Capex in specialty chemicals to increase 50% on-year this fiscal

A revival in domestic demand and continuing robust exports will spur a 50% on-year increase in the capex of specialty chemicals manufacturers this fiscal to Rs 6,000-6,200 crore. That would also be well above the Rs 5,000 crore spent before the pandemic in fiscal 2020, a CRISIL Ratings study of 106 rated specialty chemicals manufacturers, which account for a fourth of the sector's annual revenue of ~Rs 3 lakh crore, shows.

Export growth is expected to accelerate to 17-18% from 12-13% last fiscal, owing to competitive positioning of players, recovery in global demand, and the China-plus-one strategy of customers. This will also be supported by weakened competitiveness of China due to implementation of stringent environmental norms, rising labour cost, and geopolitical issues (the US-China trade war). In addition, owing to the impact of COVID-19 on the global supply chain and geo-political tensions, global suppliers are looking to diversify and expand their sourcing of products from different manufacturers across economies, including India, to minimize any disruption on their operations .Domestic growth, on its part, is likely to surge to ~20%, riding on strong demand from agrochemicals, fast-moving consumer goods (FMCGs), pharmaceutical and textile sectors, as well as a rise in discretionary spend.

Figure 21: Domestic and export revenue growth development of Indian specialty chemical companies



Notes: Based on 106 CRISIL-rated players (25% of sector's annual revenue)

Source: CRISIL Research

4.5 Key growth drivers for the Indian chemicals industry

- Per capita consumption of chemicals in India is lower compared with western countries. Hence, there is considerable scope for new investments
- A large population, huge dependence of the domestic market on agriculture, and strong export demand are the industry's key growth drivers
- The shift in the geopolitical landscape and global supply chain preference from China can provide India with a platform for converting challenges into opportunities
- The domestic market has significant growth potential as GDP and purchasing power rise
- World-class engineering and strong R&D capabilities

5 Balaji Specialty Chemicals Limited Portfolio

Balaji Specialty Chemicals Limited (BSCL) is the sole manufacturer in India of niche chemicals such as Ethylenediamine (“EDA”), Piperazine(Anhydrous) (“PIP”), Diethylenetriamine (“DETA”), Amino Ethyl Ethanol Amines (“AEEA”) and Amino Ethyl Piperazine (“AEP”),using the Monoethanol Amine (“**MEA**”) process. BSCL started commercial operations in Jun 2019 and has become one of the fastest growing specialty chemicals company in India.

5.1 Introduction to amines

Amines are ammonia derivatives, having one or more hydrogen atoms being replaced by a carbon-containing substitute. The amines market is segmented by ethyleneamines, alkylamines, fatty amines, specialty amines, and ethanolamines.

Ethanolamine

Ethanolamine is a colorless liquid amino alcohol, C_2H_7NO, used as a solvent in detergent synthesis and gas purification. It is used as feedstock in the production of detergents, emulsifiers, polishes, pharmaceuticals, corrosion inhibitors, and chemical intermediates.

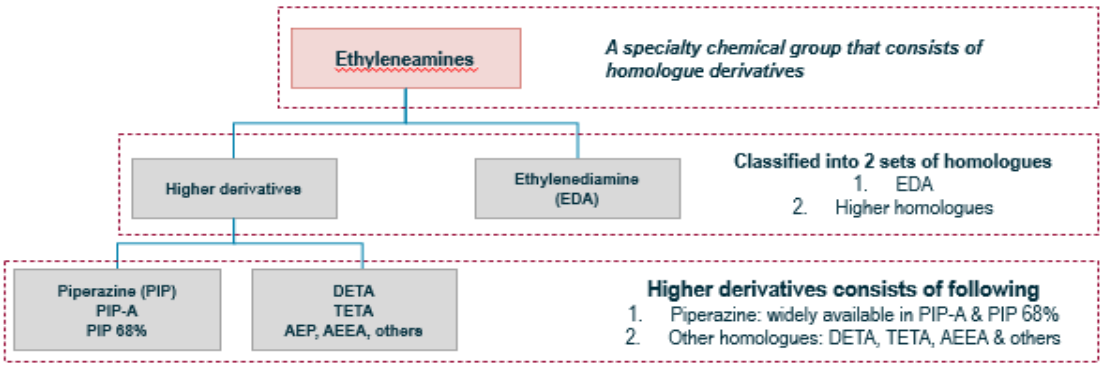
Alkylamine

Alkylamine is formed by an alkanol reaction with Ammonia in the presence of catalyst. These are mainly used as a corrosion inhibitor and in making rubber, pharmaceuticals, resins, pesticides and dyes.

Ethyleneamine

This is a class of amine compounds containing ethylene ($-CH_2CH_2-$) linkages between amine groups are ethyleneamines. Generally, these are colourless, low-viscosity liquids with a smell of fishy amines. These are mainly used in the production of urethane catalysts, epoxy curing agents, and asphalt additives. Ethyleneamines are a series of homologue specialty chemicals that are widely used for organic synthesis in drugs, dyes, pesticides, resins, chelates, pharma intermediates and others. It consists of various derivatives that are widely used both as an industrial raw material and as an end-product. One of the key characteristics of these derivatives is that any derivative used in any application is hard to be substituted by the other derivatives.

Figure 22: Ethyleneamines and derivatives



Source: CRISIL Research

At a CAGR of 10.2%, the market size of ethyleneamines is forecast to grow almost 2 percentage points faster than the other amines categories over the forecast period.

Fatty amines

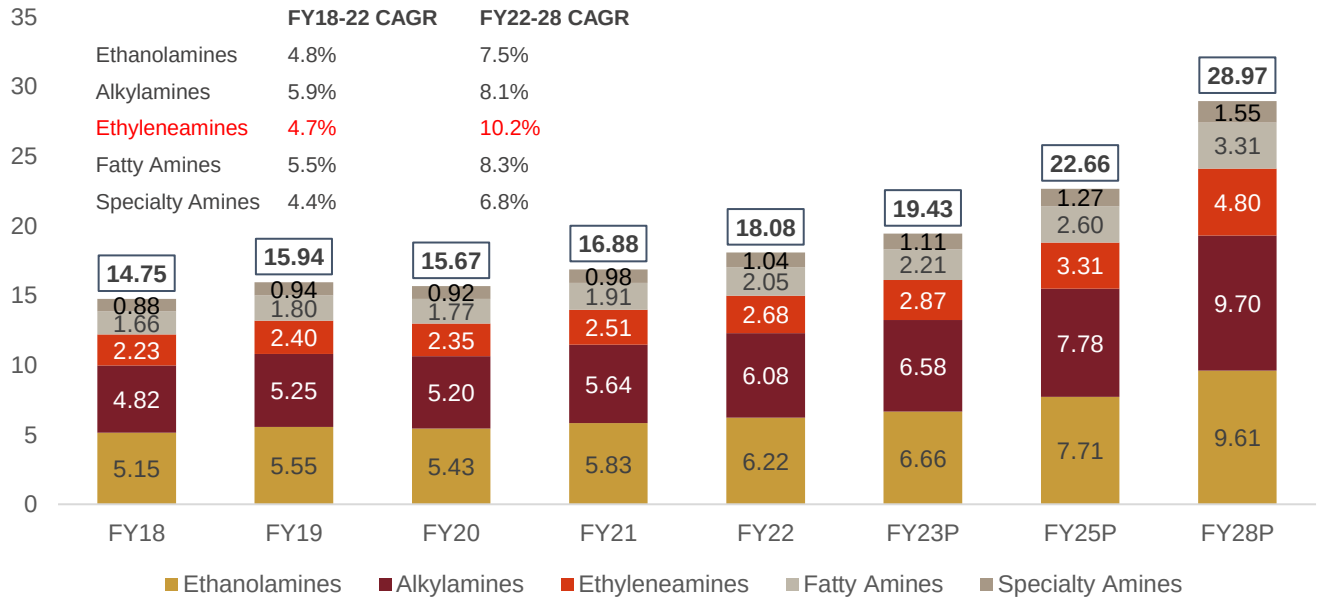
Fatty amines are nitrogen-based derivatives of fatty acids/olefins derived from raw materials such as petrochemicals, fats, and oils. Fatty amines contain either a mix of carbon chains or single chain with a number of carbons ranging from 8 to 22. Fatty amines find usage in many applications such as water treatment, agrochemicals, oilfield chemicals, asphalt additives, anti-caking and others, which include mining, personal care, fabric softener, paints and coatings, and many more.

Specialty amines

Specialty amines are important multifunctional chemicals that possess exceptional mechanical properties. Specialty amines are colourless or light-yellow liquids that are soluble in water. Specialty amines are chemical intermediaries with excellent synthesising properties. Products synthesised with specialty amines exhibit characteristics such as electric insulation and resistance to radiation, abrasion, and heat.

5.2 Global amines market

Figure 23: Global amines market revenue ($ billion), by type



P: Projected

Source: CRISIL Research

Note: Data for fiscal years

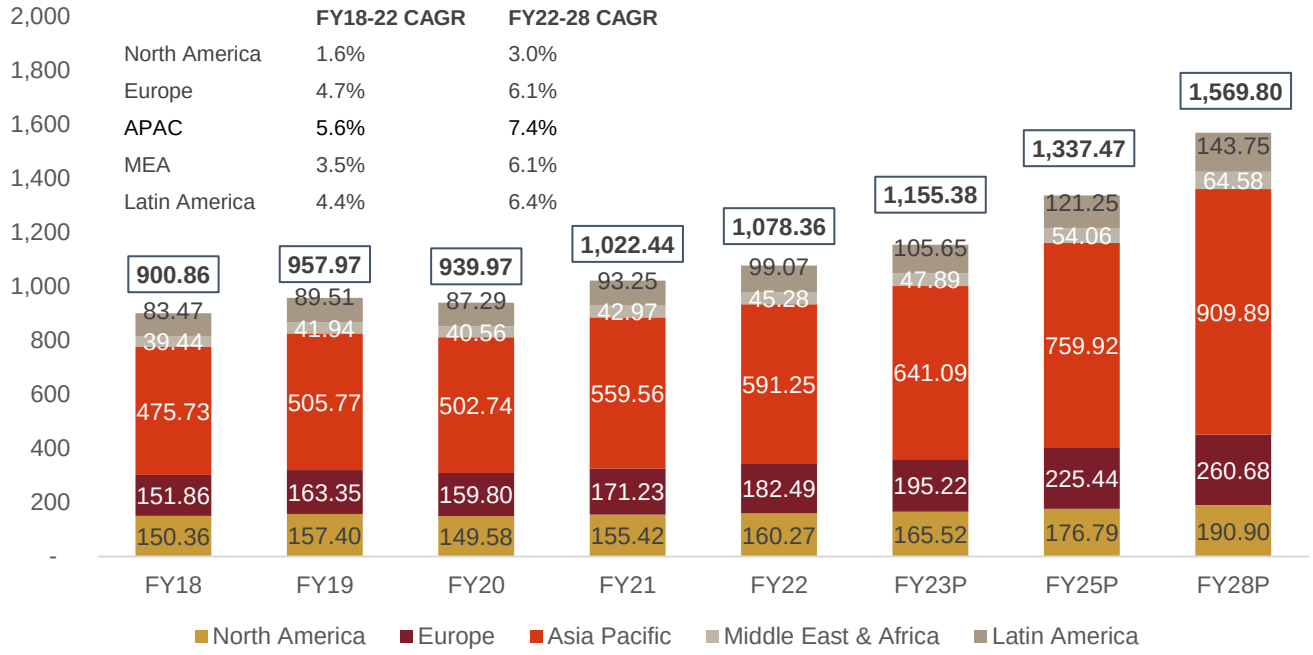
5.3 Balaji Specialty Chemicals Limited Product Portfolio

Balaji Speciality Chemicals Limited (BSCL) manufactures five key ethyleneamines products encompassing Ethylenediamine (“EDA”), Piperazine (Anhydrous)(“PIP”), Diethylenetriamine (“DETA”), Amino Ethyl Ethanol Amines (“AEEA”) and Amino Ethyl Piperazine (“AEP”).

The global market size for this basket of products was estimated to be 1,078 kilo tonne in fiscal 2022. The market grew at 4.6% CAGR between fiscals 2018 and 2022. The total market is expected to reach 1,570 kilo tonne by fiscal 2028, growing at 6.5% CAGR (fiscals 2022-2028). The global market is presently valued at $2.2 billion and is expected to grow at 6.9% CAGR to $3.3-3.4 billion by fiscal 2028.

The global manufacturing landscape for ethyleneamines is characterized with presence of leading multinational companies such as Huntsman, Tosoh, AKZO Nobel, BASF, Dow Chemical, Delamines, Shandong Lianmeng Chemicals, Xingxin Chemical, Arabian Amines Company and Columbus Chemical .Apart from the global players, BSCL is the only Indian Company which has the plant and technology for manufacturing of these products. Globally, the aforementioned products are manufactured either via ethylene dichloride (EDC) route or reductive amination of mono ethanolamine (MEA) route. Manufacturing of these products involves patented technology and is capital intensive.

Figure 24: Global market size (kilo tonnes[1]) for the products in BSCL's portfolio



[1]1 kilo ton = 1000 MT

P: Projected

Source: CRISIL Research

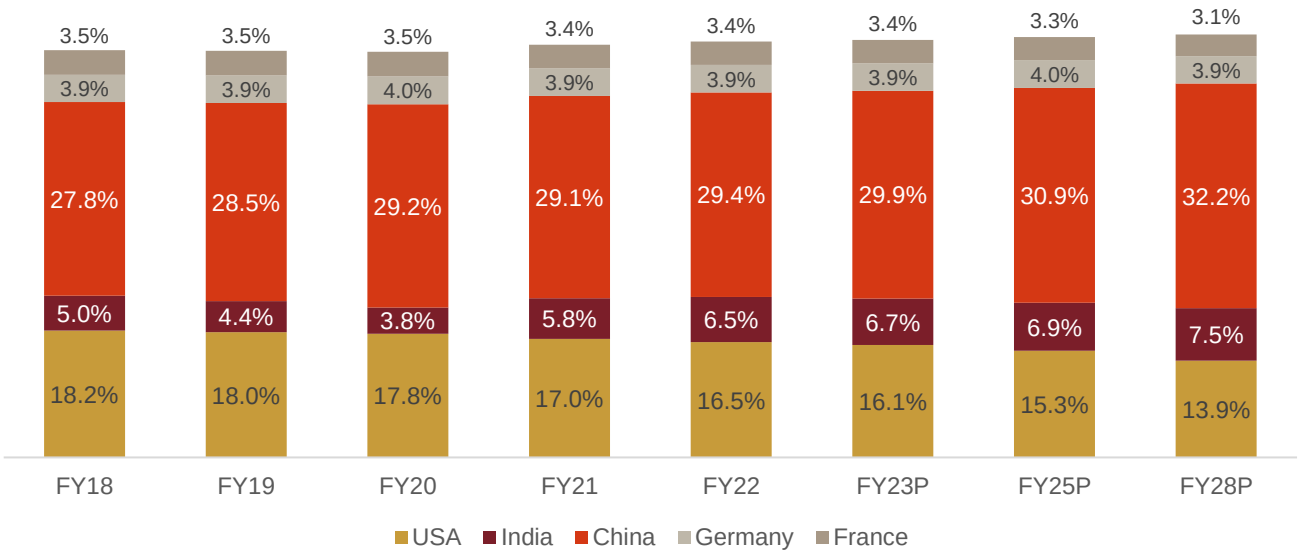
Note: Data for fiscal years

In fiscal 2022, BSCLs share of the global market in volume terms was 2.2% for EDA, 0.6% for PIP, 2.0% for DETA, 0.4% for AEEA and 0.6% for AEP. Its cumulative global market share for all five products was around 1.6% in fiscal 2022, having grown by ~106% CAGR in its three years of operations, fiscal 2020 to fiscal 2022.

The increasing demand in speciality chemicals, pharmaceuticals and agrochemicals from developing economies like India is likely to increase the consumption of these chemicals and its derivatives. Growing demand from these end use industries will boost the market of ethyleneamines as these plays a crucial role as an intermediate in these end-use industries.

The top five countries – China, the US, India, Germany, and France – make up the lion's share of the worldwide market at around 60%. Other important countries are Japan, Korea, Malaysia, and Brazil.

Figure 25: Market share of major countries (as a % of total global market revenue)



P: Projected

Source: CRISIL Research

Note: Data for fiscal years

Ethylenediamine (EDA)

EDA is ethylene amine with the lowest molecular weight. It contains two primary amine groups and is a colourless liquid, with ammonia-like odour. It is commonly used as a building block for production of many other chemical products**.**

A most prominent derivative of EDA is the chelating agent ethylenediamine tetra acetic acid (EDTA), which is derived from EDA via Strecker synthesis involving cyanide and formaldehyde. Numerous bio-active compounds and drugs contain the N-CH_2-CH_2-N linkage, including some antihistamines. Further, in recent times, ethylenediamine has been started to be used in pharmaceuticals intermediates, which is expected to grow further going forward.

Table 4: EDA application overview

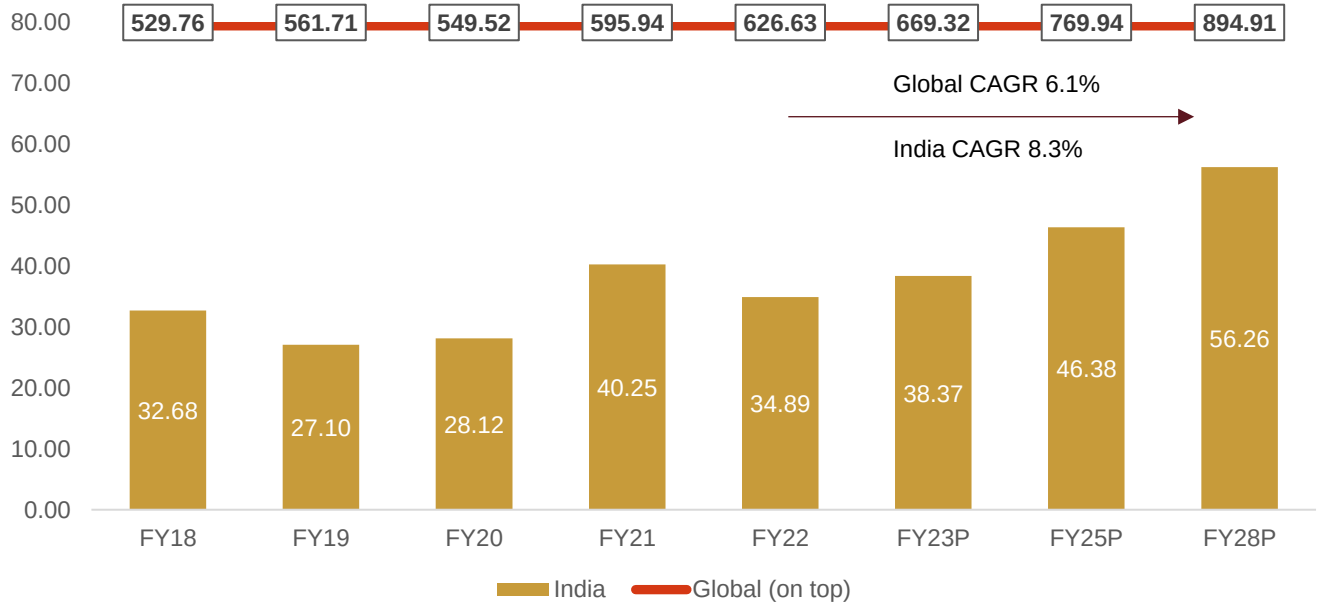
Key applications	Brief overview of application usage areas
Specialty chemicals	Synthesis of a chelating agent such as ethylenediamine tetra acetic acid (EDTA) Other application areas include bleach activators, corrosion inhibitors, epoxy resins, polyamide resins (for paints, coatings polymer applications), fabric softeners, lubricants/fuel additives, emulsifiers, surfactants, textile chemicals, paper chemicals
Agrochemicals	EDA is used as main raw material for di-thiocarbamate fungicide such as Mancozeb, Maneb and Zineb, etc.
Pharmaceuticals	EDA is a potent sensitiser used in topical medications, particularly antibiotic/steroid creams for its chemical stabilising properties. EDA is also an ingredient of aminophylline, a xanthine bronchodilator used in the treatment of

	asthma and other respiratory problems. Other medications where EDA or its derivatives are found include some antihistamine and anti-nausea agents. EDA has also been used in dermatologic preparations.

Source: CRISIL Research

The size of the global EDA market is ~626.6 kilo tonne as of fiscal 2022. Revenue-wise, it reached $1.3 billion in fiscal 2022, having grown at a CAGR of 5.0% between fiscals 2018 and 2022. It is expected to be a $1.9 billion global market by fiscal 2028, growing at 6.5% CAGR between fiscals 2022 and 2028.

Figure 26: Market size for EDA (kilo tonnes[1])



[1]1 kilo ton = 1000 MT

P: Projected

Source: CRISIL Research

Note: Global values on top bar ;Data for each fiscal year

Piperazine (PIP)

Piperazine is a cyclic ethylene amine with two secondary amine groups**.** In its pure form, PIP has a freezing point of 106°C and a boiling point of 147°C. Due to its narrow liquid range, commercial piperazine is often supplied as 68% active content diluted with water (PIP 68%). It is also supplied in anhydrous form (PIP 99%) or piperazine flakes.

Table 5: Piperazine application overview

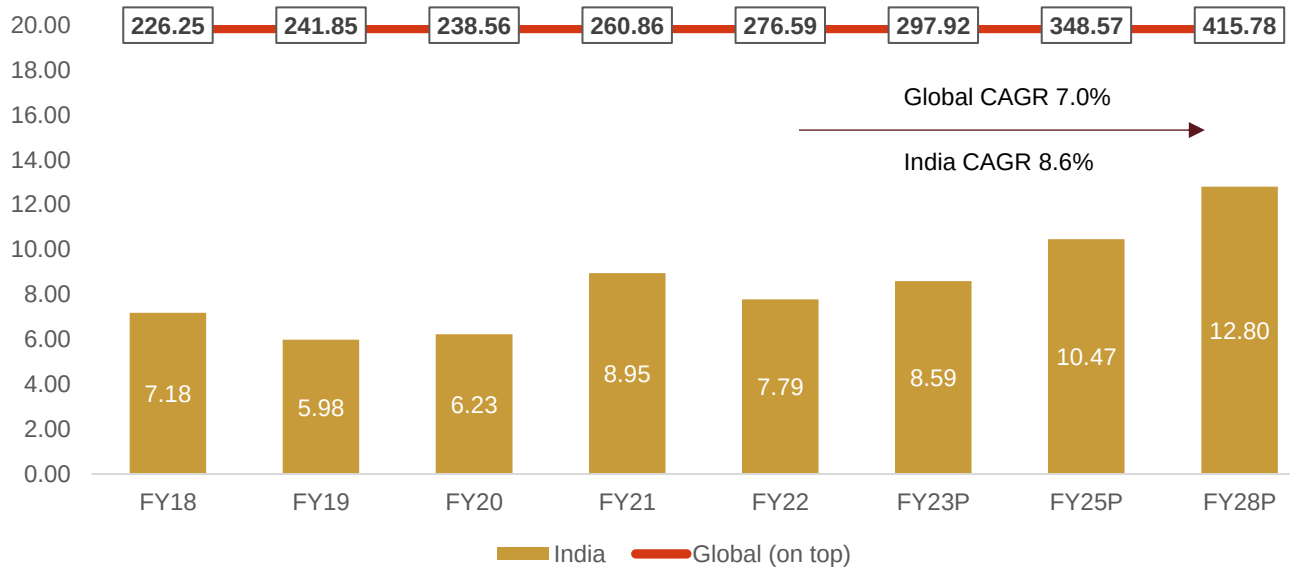
Key applications	A brief overview of application usage areas
Pharmaceuticals	As medicines, the piperazine ring is found in anti-infective, antibiotics, anticancer agents, cardiovascular agents and others. Piperazine is commonly used as a raw material for several commercially available drugs. It is used as a raw material in the production of quinolone drugs, such as Ciprofloxacin and Norfloxacin. Other drugs containing it include anti-helmintics, sedatives, antihistamines, antifilarials, tranquillizers, and analgesics. Piperazine chips serve as a synthesis component in the production of Viagra.
Specialty chemicals	Piperazine can be used in the production of polyamides for hot-melt, pressure-sensitive, and heat-seal adhesives for leather, paper, plastic, and metal.

	Piperazine is used in the production of polyamide resins (a reagent, along with fatty acids), urethane and epoxy systems. In polyurethanes it is both a catalyst, a reagent and a reactant used to produce polyol components. Polyamide resins based on piperazine find use as binders in printing inks for flex gravure printing on certain paper, film, and foil webs. Thermoplastic polyamides are similarly used in formulating glossy, abrasion-resistant, overprint varnishes.
	Piperazine is employed as an additive for gas sweetening - removal of hydrogen sulphides (CO_2 and H_2S gas treatment area)

Source: CRISIL Research

The size of the global PIP market is ~276.6 kilo tonne as of fiscal 2022.The global market for piperazine is valued at $572 million in fiscal 2022. It is expected to increase to $880 million by fiscal 2028, growing at a CAGR of 7.4% between fiscals 2022 and 2028.

Figure 27: Market size for Piperazine (in kilo tonnes[1])



[1]1 kilo ton = 1000 MT

P: Projected

Source: CRISIL Research

Note: Global values on top bar; Data for each fiscal year

Diethylenetriamine (DETA)

Diethylenetriamine (DETA) is a linear ethylene amine containing two primary and one secondary nitrogen. DETA is a member of the ethylene amines family. At room temperature, it is a 'colorless to light yellow' liquid with an ammonia-like odor and is readily soluble in both water and organic solvents. DETA is a structural analogue of diethylene glycol. Its chemical properties resemble those for Ethylenediamine and has similar uses. It is a weak base, and its aqueous solution is alkaline. DETA is a byproduct of the production of Ethylenediamine.

Table 6: DETA application overview

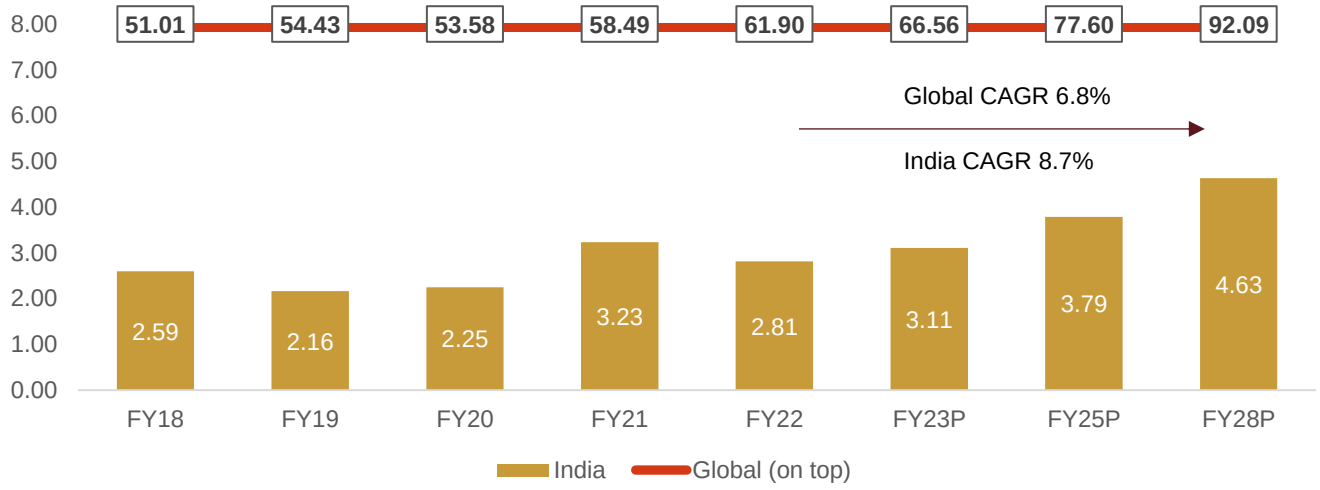
Key applications	A brief overview of application usage areas
Specialty Chemicals	Used in the oil industry as a solvent for sulphur and extraction of acid gas. Used as additive in oil drilling industry as viscosity modifiers and emulsifiers

	Used as chelating agents for detergents, pigment dispersion, metal treating, and oil production. DETA is collector that enhances flotation separation for use in collection of iron and other metals
	DETA is utilised as hardener for epoxy resins
	It is used as a softener and fixator in the textile industry. DETA is the building block in the manufacture of imidazoline-based corrosion inhibitor and asphalt-modification additives.
	Diethylenetriamine is a common curing agent for Epoxy-Resins in epoxy adhesives. In coordination chemistry, it serves as a tridentate ligand-forming complexes, such as Co(dien)(NO2)3. Like some related amines, it is used in the oil industry for the extraction of acid gas. DETA can be used to sensitize nitromethane, making a liquid explosive compound similar to PLX. Mixed with unsymmetrical Dimethylhydrazine, it was used as Hydyne, a propellent for liquid-fuel rockets.
Pharmaceuticals	It is main component of anthelmintics and psychoactive drugs

Source: CRISIL Research

The size of the global DETA market is ~61.9 kilo tonne as of fiscal 2022. The global market for DETA is valued at $129 million in fiscal 2022. It is expected to increase to $196 million by fiscal 2028, growing at a CAGR of 7.2% between fiscals 2022 and 2028.

Figure 28:Market size for DETA (in kilo tonne1)



[1]1 kilo ton = 1000 MT

P: Projected

Source: CRISIL Research

Note: Global values on top bar; Data for each fiscal year

Amino Ethyl Ethanol Amines (AEEA)

Amino Ethyl Ethanol Amines (AEEA) is a linear molecule with primary and secondary amine groups. AEEA is a single component product, with minimal Ethylenediamine impurities. AEEA is a colorless liquid, with slightly higher viscosity than EDA and DETA and has an ammonia-like odour.

AEEA is an organic base used in the industrial manufacture of fuel and oil additives, chelating agents, and surfactants.

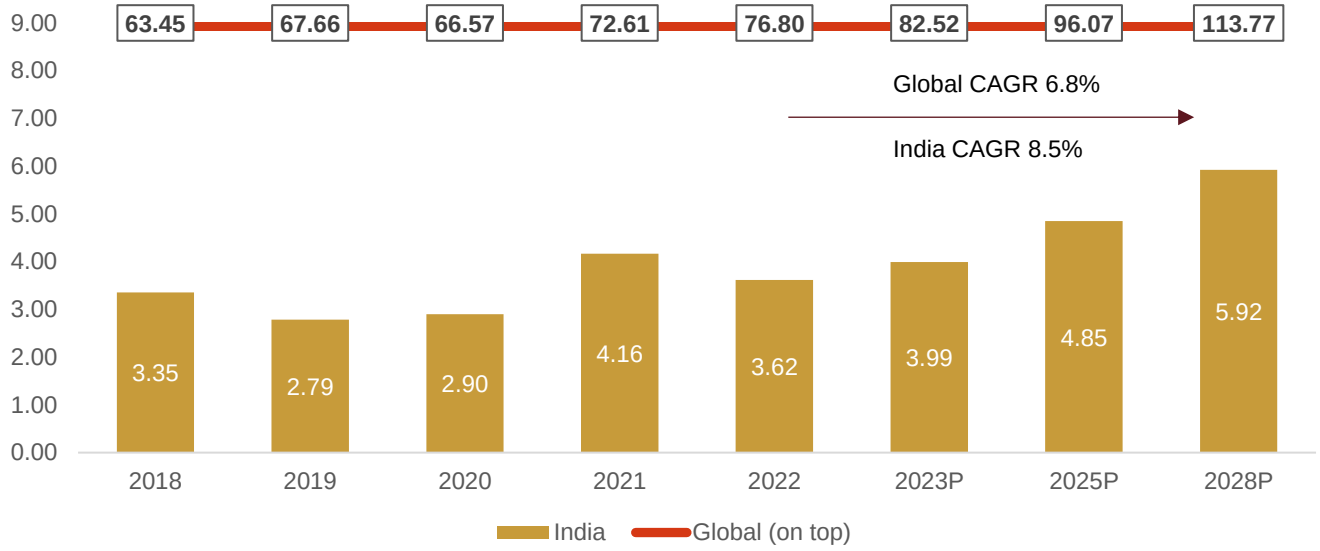
Table 7: AEEA application overview

Key applications	A brief overview of application-usage areas
Specialty chemicals	Used as lube-oil additives
	Formulated as an intermediate to form chelating agents
	AEEA is used to manufacture wet-adhesion additives for latex paints, also used in urethane systems
	Manufacture of fabric softeners, fuel additives, corrosion inhibitors

Source: CRISIL Research

The size of the global AEEA market is ~76.8 kilo tonne as of fiscal 2022. The global market for AEEA is valued at $160 million in fiscal 2022. It is expected to increase to $243 million by fiscal 2028, growing at a CAGR of 7.2% between fiscals 2022 and 2028.

Figure 29: Market size for AEEA (in kilo tonne[1])



[1]1 kilo ton = 1000 MT

P: Projected

Source: CRISIL Research

Note: Global values on top bar ; Data for each fiscal year

Amino Ethyl Piperazine (AEP)

Amino Ethyl Piperazine (AEP) is an ethylene amine with a unique molecular structure, as it contains a primary, secondary and tertiary amine. AEP is a single- component product which is clean, has ammonia-like odour and a colorless with a broad liquid range, making it a suitable raw material for a large variety of applications. Amino Ethyl Piperazine is an organic compound with a wide range of commercial and industrial applications. It is used primarily as reactive intermediates (i.e., building blocks) to produce other useful chemical products, due to its unique combination of reactivity, surface activity, and basicity.

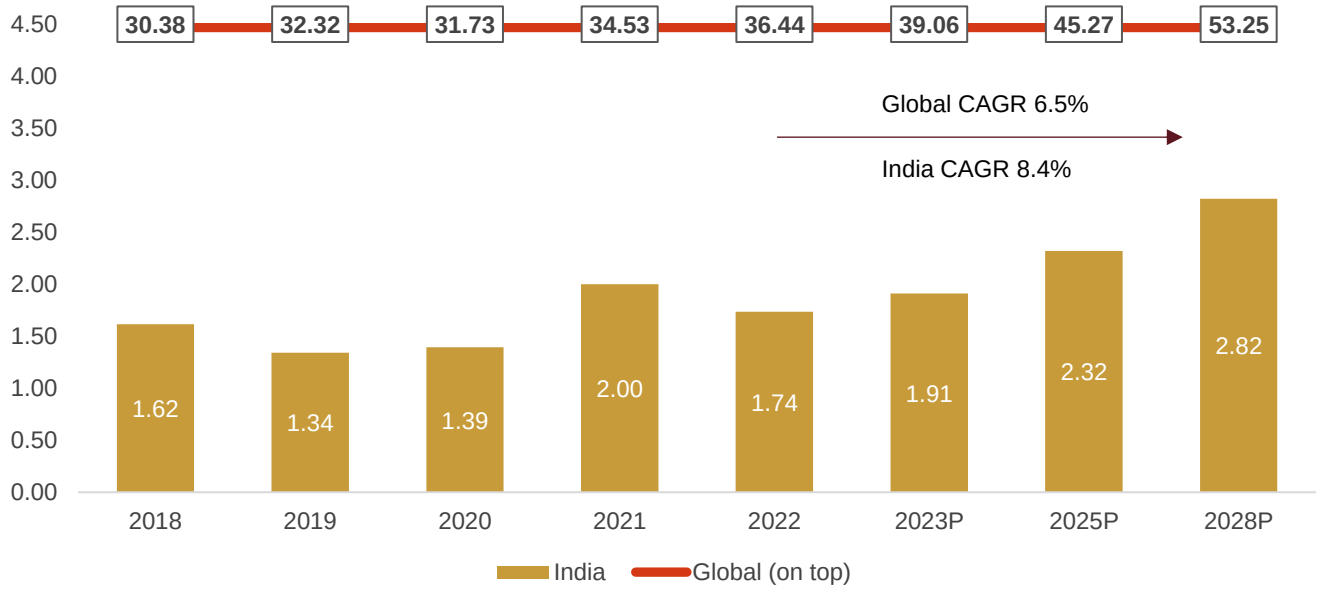
Table 8: AEP application overview

Key applications	A brief overview of application usage areas
Specialty chemicals	Mineral processing aids, ore floatation agents
	Epoxy curing agents, urethane chemicals
	Production of asphalt chemicals, corrosion inhibitors, petroleum production chemicals
	Is it used for asphalt chemicals, corrosion inhibitors, epoxy curing agents, ore floatation agents, urethanes, mineral processing aids, petroleum production chemicals and poly amide resins. When used as an epoxy resin curing agent, it is usually used in conjunction with other amines as an accelerator as it only has three amine hydrogens for cross-linking.

Source: CRISIL Research

The size of the global AEP market is ~36.4 kilo tonne as of fiscal 2022. The global market for AEP is valued at $76 million in fiscal 2022. It is expected to increase to $114 million by fiscal 2028, growing at a CAGR of 6.9% between fiscals 2022 and 2028.

Figure 30: Market size for AEP (in kilo tonnes[1])



[1]1 kilo ton = 1000 MT

P: Projected

Source: CRISIL Research

Note: Global values on top bar ; Data for each fiscal year

5.4 Global and India Market Summary

Table 9: Overview of BSCL product market size development in India and globally

Product	Global Market Size (Kilo Tonnes[1)] - KT)			India Market Size (Kilo Tonnes[1)] - KT)			Global Market	India Market
	FY18	FY22	FY28P	FY18	FY22	FY28P	CAGR (FY22-28)	CAGR (FY22-28)

EDA	529.76	626.63	894.91	32.68	34.89	56.26	6.1%	8.3%
PIP	226.25	276.59	415.78	7.18	7.79	12.80	7.0%	8.6%
DETA	51.01	61.90	92.09	2.59	2.81	4.63	6.8%	8.7%
AEEA	63.45	76.80	113.77	3.35	3.62	5.92	6.8%	8.5%
AEP	30.38	36.44	53.25	1.62	1.74	2.82	6.5%	8.4%
Total	**900.86**	**1,078.36**	**1,569.80**	**47.42**	**50.85**	**82.43**	**6.5%**	**8.4%**

[1]1 kilo ton = 1000 MT, P: Projected

Source: CRISIL Research

5.5 BSCL Market Positioning

Table 10: BSCL market positioning in India and globally

S.No	Products	Sales volume in Fiscal 2022 (in MT)	Industry Segment*	End-Use Application*	Company's market position in India[1]	Company's market position globally[2]
1	Ethylenediamine (EDA)	13,941.87	Specialty Chemicals	Production of Chelating Agents (EDTA), bleach activators, corrosion inhibitors, epoxy resins, polyamide resins (for paints, coatings polymer applications), fabric softeners, lubricants/fuel additives, emulsifiers, surfactants, textile chemicals, paper chemicals	Sole manufacturer using the MEA process, 25.9% market share in FY22	2.2% market share in FY22
			Agrochemicals	Production of Dithicarbamate Fungicides such as Mancozeb, Maneb and Zineb, etc.		
			Pharmaceuticals	Production of Aminophylline, a xanthine bronchodilator used in the treatment of asthma and other respiratory problems, antihistamine, antibiotic/steroid creams		
2	Piperazine (PIP)[3]	1,541.27	Pharmaceuticals	Production of quinolone drugs, such as Ciprofloxacin and Norfloxacin. Other drugs containing it include anti-helmintics, sedatives, antihistamines, antifilarials, tranquillizers, and analgesics.	Sole manufacturer using the MEA process, 57.5% market share in FY22	0.6% market share in FY22
			Specialty Chemicals	Polyamide Resins, Oil field chemicals for gas sweetening		

3	Diethylenetriamine (DETA)	1,223.73	Specialty Chemicals	Additive in oil drilling, chelating agent in detergents and metal treating	Sole manufacturer using the MEA process, 11.4% market share in FY22	2.0% market share in FY22
			Pharmaceuticals	Anthelmintics, psychoactive drugs		
4	Amino Ethyl Ethanol Amines (AEEA)	326.76	Specialty Chemicals	Lube Oil and Fuel Additives, Surfactants, Fabric Softeners	Sole manufacturer using the MEA process, 21.6% market share in FY22	0.4% market share in FY22
5	Amino Ethyl Piperazine (AEP)	203.50	Specialty Chemicals	Corrosion Inhibitors, Ashphalt Chemicals, Epoxy Curing Agents, Poly Amide Resins.	Sole manufacturer using the MEA process, 3.5% market share in FY22	0.6% market share in FY22

Note:

1) Market share in India has been calculated on the basis of sales volume of the relevant product in India in Fiscal 2022, including imports.
2) Global market share has been calculated on the basis of total sales volume of relevant product during Fiscal 2022 and global market size in terms of sales volume
3) Anhydrous form

5.6 Competitive landscape in India and growth outlook for BSCL

Balaji Specialty Chemicals Limited (BSCL) is the sole manufacturer of specialty chemicals using MEA process for manufacturing of products such as Ethylenediamine (EDA), Piperazine (Anhydrous) (PIP), Diethylenetriamine (DETA), Amino Ethyl Ethanol Amines (AEEA) and Amino Ethyl Piperazine (AEP). in India. These products are import substitutes – the current imports for these products in India, for instance, were close to 37.8 kilo tonnes in fiscal 2022.

Manufacturing technology

Balaji Specialty Chemicals Limited (BSCL) manufacturing process is based on reductive amination of mono ethanol amine (MEA) with ammonia over a heterogeneous catalyst route. The manufacturing via MEA process does not involve chlorine (Chlorine is considered hazardous chemical) chemistry unlike via EDC route.

Mono ethanolamine and ammonia are reacted under hydrogen atmosphere over a catalyst at a pressure of around 150-200 Kg/Cm² and the temperatures are preferably between 150 Deg.C and 225 Deg.C and continuously converted into a mixture of Ethylenediamine, Diethylenetriamine, Piperazine, Amino Ethyl Piperazine, Hydroxy Ethyl Piperazine and Amino Ethyl Ethanol Amines. The reaction mixture obtained from the reactor is then subjected to a series of distillations for recovering of the products and recycling the excess raw materials and byproducts formed in the reaction. The byproducts formed are recycled back to the reaction stage for conversion of desired products.

Reaction:

Easy availability of raw materials

The key raw material required are mono ethanol amine (MEA) and ammonia (NH_3), which are easily available and there are no restrictions on their procurement.

BSCL's state-of-the-art manufacturing infrastructure

Incorporated in 2010 as Balaji Benzochem Private Limited in August 2010, commenced commercial production from our manufacturing facility located at Solapur, Maharashtra in 2019. Balaji Specialty Chemicals Ltd's manufacturing facility, spread over 41,920 sq m, is located at MIDC, Chincholi, Solapur, Maharashtra. The plant has an installed capacity of 30,000 TPA with environmental clearance (EC) of 45,330 TPA. The manufacturing facility has been declared a mega project by the state government of Maharashtra and is eligible for a 50% refund of state-GST on a gross basis.

The company's location of the facility near the major highway and rail routes and with a branch line to the neighboring states of Karnataka and Hyderabad, which are the main hubs for pharmaceutical and agrochemical industries, provides cost and logistical advantage.

The company's manufacturing facility is first of its kind in India to manufacture these niche products by using MEA process. The process uses a High Pressure-High Temperature Catalytic Fixed Bed Reactor with Equilibrium Reaction and is based on "continuous flow" across multiple unit operations. The basic technology/engineering was exclusively licensed for India from a reputed International Technical University for 10 years, commencing from June 2019. The detailed engineering, process flow, P&I drawings, balancing equipment for reactor, distillation, and other areas of the process parameters, suitable to Indian conditions, were done internally by the in-house engineering team. The continuous flow nature of the process ensures a longer life of the catalyst, enabling maximizing capacity over the entire catalyst life. Further, this also ensures consistent operations and quality of products with optimum consumption coefficient of raw materials.

BSCL's plant (production process) is fully automated and is controlled by an automated DCS control system. All process parameters are monitored and controlled using the DCS system with communication, power, and processor redundancy. Additionally, the facility has an effluent treatment system, to make the facility a zero liquid discharge (ZLD) facility.

Table 11: Balaji Specialty Chemicals Limited (BSCL) installed and licensed capacity

S. No	Manufacturing location	Products	Installed capacity, MTPA	Licensed capacity, MTPA (environmental clearance approved total capacity)
1	Maharashtra, Solapur (MIDC, Chincholi)	Ethylenediamine (EDA)	22,020	37,350
2		Piperazine (PIP)	4,050	4,050
3		Diethylenetriamine (DETA)	3,150	3,150

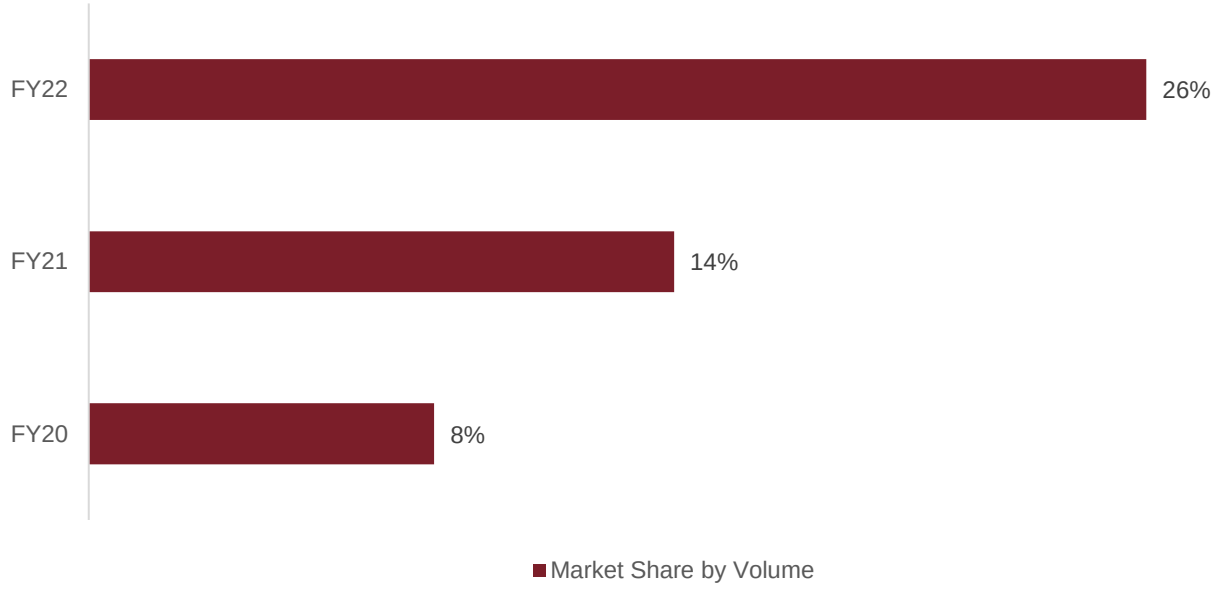
4		Amino Ethyl Piperazine (AEP) / Amino Ethyl Ethanol Amines (AEEA) /Hydroxy Ethyl Piperazine/Mixture of Higher Amines	780	780
Total capacity			30,000	45,330

Source: CRISIL Research

BSCL's market share in India

Since the commencement of its operations in fiscal 2020, the company's share has growth to roughly one-fourth of the total Indian market by volume.

Figure 31: BSCL's share of the Indian market (FY20 to FY22)



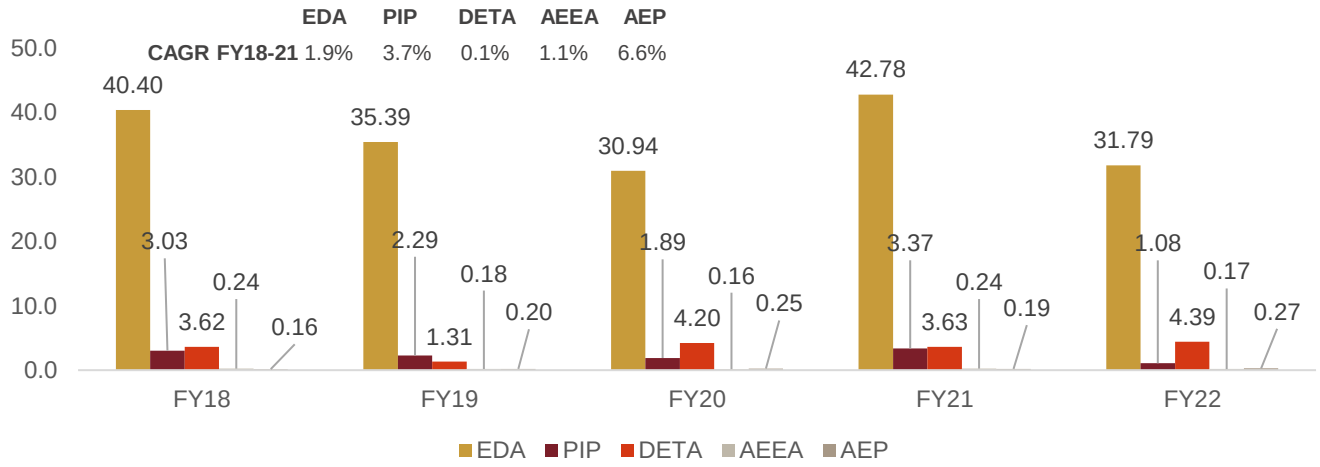
Note: The overall India market size determined based on imports and domestic sales of the five molecules. Market share calculated by taking BSCLs domestic sales volumes as a percentage of the overall India market size in terms of volumes.

Source: CRISIL Research

The future of BSCL's share in the Indian market will rely on the balance between local manufacturing and imports and will be subject to extent the company is able to replace import requirements of major players with domestic production. On the export front, the company has received REACH registration for EDA and DETA products, which enable it to export its products within the European Union.

In Fiscal 2022, India imported 31.8 KT of Ethylenediamine, 1.1 KT of Piperazine, 4.4 KT of Diethylenetriamine, 0.2 KT of Amino Ethyl Ethanol Amines and 0.3 KT of Amino Ethyl Piperazine. Further, in the last three years (Fiscal 2020-2022), India cumulatively imported 125.4 KT of these products, i.e., 105.5 KT of Ethylenediamine, 6.3 KT of Piperazine, 12.2 KT of Diethylenetriamine, 0.6 KT of Amino Ethyl Ethanol Amines and 0.7 KT of Amino Ethyl Piperazine.

Figure 32: India's imports for the products in BSCL's portfolio (in kilo tonnes[1])



[1]1 kilo ton = 1000 MT

Source: CRISIL Research

Currently, there are no effective substitute for the products that BSCL manufactures for the end user industries and historically such products were imported from countries such as Japan, China, Belgium, Sweden, and Saudi Arabia and catered to a significant portion of the total demand for these products.

Other factors that will play a critical role include in influencing market dynamics:

Market entry barriers in India

Entry barriers to new entrants for these products, due to difficulty in access to technology, as the technology providers have agreements with the manufacturers (exclusive agreements for long period of time). Capex requirement is also significantly high, technical know-how required to produce the products and requirement of large distribution network which may not be possible for new entrants in the market.

Planned capacity addition by BSCL's domestic customers

Companies such as Indofil, UPL and Aarti Industries, among others, which are key customers of BSCL, have announced plans to expand their capacity in the coming fiscals.

Indofil has taken environmental clearance (EC-Dec, 2021) approval for its Unit-3 in Dahej to double its existing capacity, encompassing Mancozeb, Maneb, Zineb, Propineb and its formulation from 35,500 tonne per annum to 75,500 tonne annum. UPL has taken environmental clearance (EC-Dec, 2019) approval for its Unit-1 to double its existing cumulative capacity, encompassing Mancozeb, Maneb and Zineb, from 650 TPM (7,800 tonne per month) to 1,300 TPM (15,600 tonne per annum). Aarti Industries has taken the EC approval for setting up of API, bulk drug manufacturing facility of capacity 210 TPM (tonne per month) in Maharashtra, Tarapur. The company plans to manufacture drugs, such as Ranolazine (25 TPM) and Aminophyline (25 TPM).

These developments indicate a positive mid-to-long term outlook for BSCL, whose products are used as raw material by these companies.

Production ramp-up flexibility

Debottlenecking and addition of columns planned in the near future. Capacity expansion also planned – the company can expand with minimum capex to meet the demand in a short time.

Global reach and customer base

The company has a well-established marketing network, client base includes 182 customers (domestic – 148, overseas-34) as on 31st March 2022, comprising of leading specialty chemical, pharmaceutical and agrochemical manufacturers. The company currently exports to the US, Asia, and Europe regions. Key export countries include UK, Belgium, Italy, China, the UAE, Turkey, Korea, Malaysia, and Kuwait. Demand for Ethylenediamine (EDA) from China alone was approximately 1,600 tons in CY2021 as per import statistics.

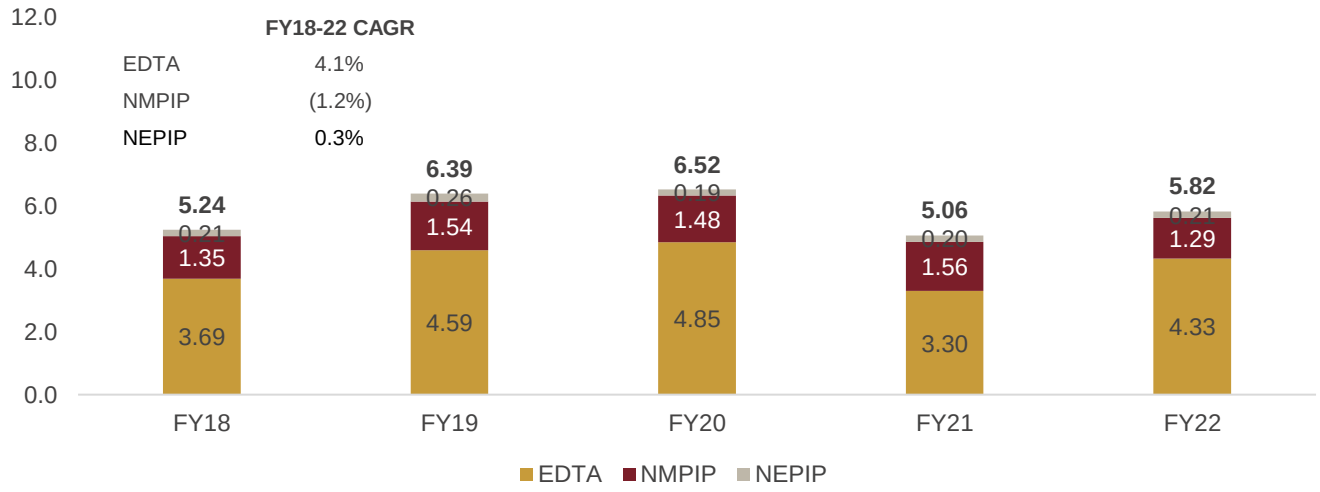
Company has backing from its parent company

Rich experience of the promoters in similar state-of-the-art technology products, which are manufactured for the first time in India and are import substitutes. BSCL is a subsidiary of Balaji Amines Limited (BAL), one of the leading manufacturers of aliphatic amines in India. The company has its backing from its parent, Balaji Amines, which holds a 55% stake in BSCL. BAL is one of the leading manufacturers of aliphatic amines manufacturers in India. BAL specialize in manufacturing of methylamines, ethylamines, derivatives of specialty chemicals and pharma excipients. and is one of the leading manufacturers of aliphatic amines in India. The key products manufactured by BAL includes mono methyl amine, di methyl amine, tri methyl amine and di ethyl amine which are used in pharmaceutical and agrochemical industry with various end use application such as corrosion control, photographic chemicals, solvents, dye stuff and corrosion inhibitors amongst others. BSCL can leverage BAL's expertise in manufacturing of amines that are produced by reacting at elevated temperatures, a first reactant used in various industries, which is either an alcohol, an aldehyde, or a ketone with a second reactant which is either ammonia, a primary or secondary amine or a nitrile in the presence as catalyst.

5.7 Market assessment for new products in BSCL's portfolio

The company is working on a number of products, which are under development, and some of these are downstream / value-added products for the existing products. Some of the products include ethylenediamine tetra acetic acid (EDTA), N-Ethyl Piperazine (NEPIP) and N-Methyl Piperazine (NMPIP) and some other derivatives. In India, the products are being primarily imported in large quantity, which the company plans to substitute through local manufacturing.

Figure 33: India import trends in kilo tonnes[1] (FY18 to FY22)



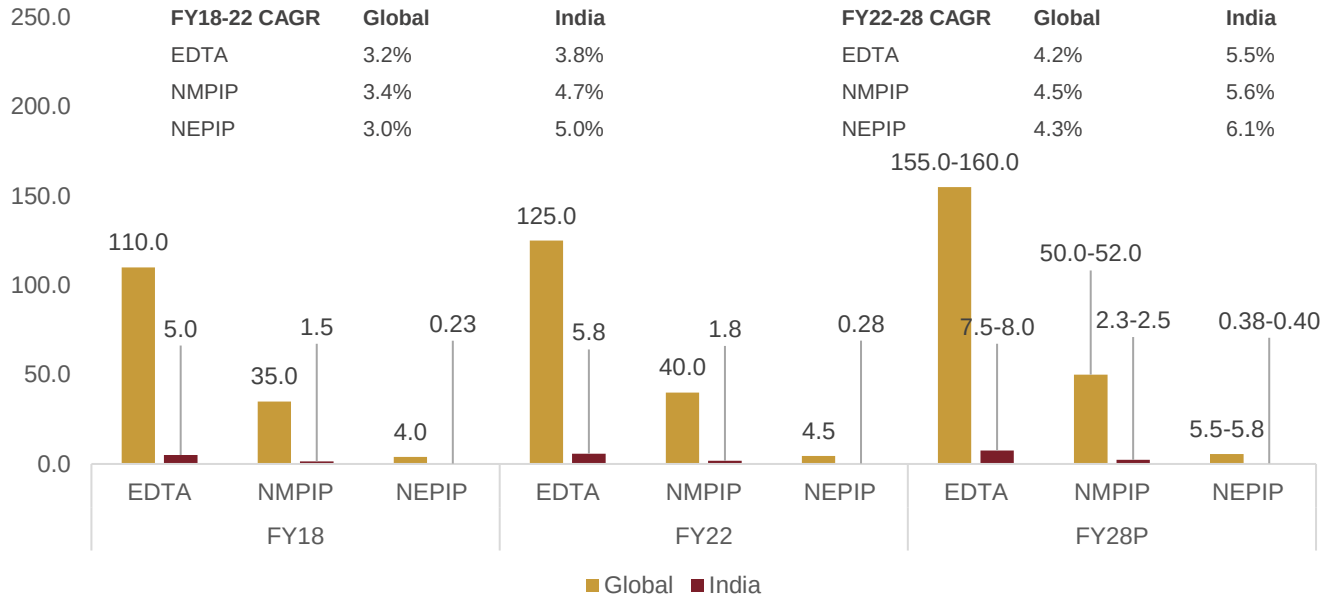
[1]1 kilo ton = 1000 MT

Source: CRISIL Research

As of fiscal 2022, the estimated size of the global market is 110 kilo tonne for EDTA, 35 kilo tonne for NMPIP and 4 kilo tonne for NEPIP. The market size, in fiscal 2022, in value terms is $198-200 million for EDTA, $190-192.5 million for NMPIP and ~$24 million for NEPIP.

The Indian market makes up roughly 4%-5% of the total EDTA market and is estimated to be around 5 kilo tonne. Indian market sizes for NMPIP and NEPIP are estimated at 1.5 kilo tonne and 0.23 kilo tonne, respectively, making up 4%-6% each of their corresponding global market sizes. There are a limited number of manufacturers, who are manufacturing the aforementioned products in India.

Figure 34: Global and Indian Market Sizes - historical and forecast for EDTA, NEPIP, NMPIP (kilo tonnes[1])



[1]1 kilo ton = 1000 MT

P: Projected

Source: CRISIL Research

6 Market assessment by end-use application

6.1 Pharmaceuticals

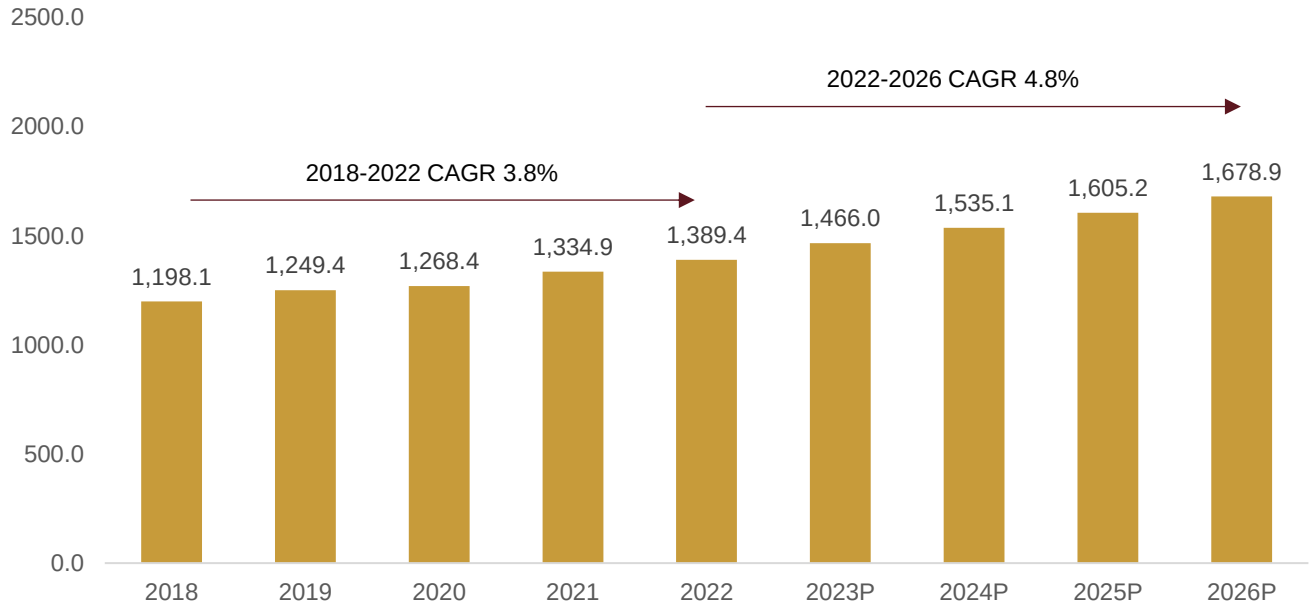
Global market posts healthy growth in 2021 as Covid-19 infection rates ease

The pharmaceutical market posted relatively slower growth in 2018 and 2019 on account of pricing pressure. While it was flat in 2022, growth is estimated to have been higher in 2021 on account of reopening of economies with the subsiding of Covid-19 infection rates, which enabled increase in number of patient treatments in clinics and healthcare centres. Rising R&D in drug manufacturing, prevalence of chronic diseases, availability of generics, and uptake of biopharmaceuticals will continue to be some of the key drivers for the global pharmaceuticals industry. In the near term, strategic initiatives, such as new drug launches and biological products, acquisitions, collaborations, and regional expansion, are also expected to fuel market growth. However, unfavourable drug price control policies in several markets and high manufacturing costs are expected to be some of the limiting factors.

Global pharmaceutical market to grow at a steady ~5% CAGR from 2020 to 2026

The global pharmaceutical market, which expanded 4.5-5.0% between 2016 and 2020 to ~$1,270 billion, is expected to sustain the growth momentum over the next five years, reaching $1,650-1,700 billion in 2026. New product launches, an ageing population, sedentary lifestyles, increasing prevalence of chronic diseases, technological advances, new methods for drug discovery, and increase in pharmaceutical drug usage are key drivers for the industry. Also, pharmaceutical companies are offering customized individual drug treatment for better treatment against diseases, and precision medicine that aims to provide medical care according to the patient's individual characteristics, needs, preferences, and genetic make-up.

Figure 35: Global pharmaceutical drugs market size ($ billion)



P: Projected

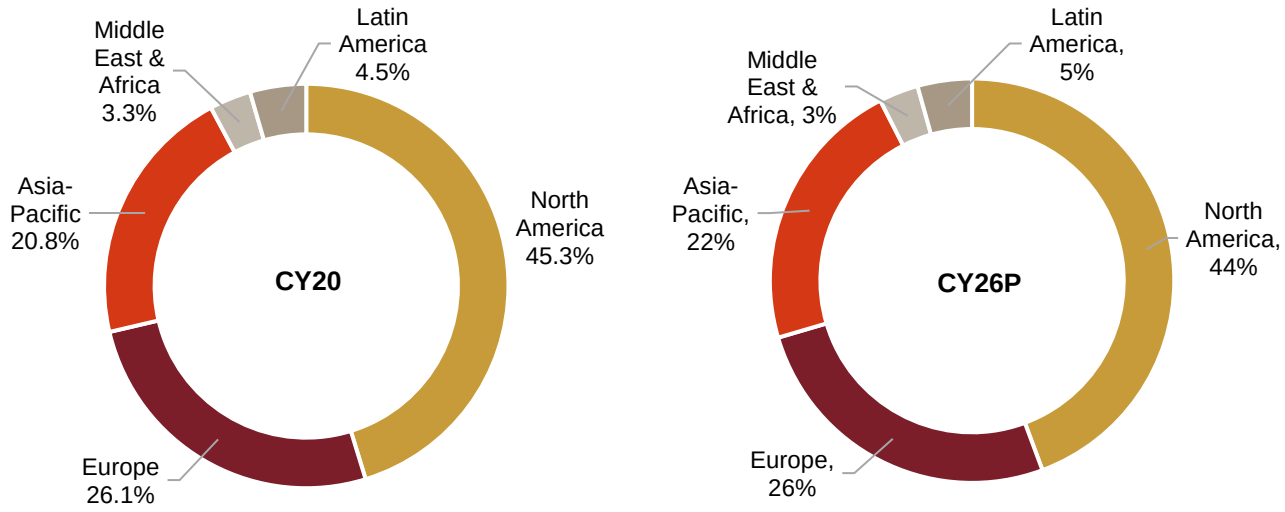
Note: Data for each calendar year

Source: CRISIL Research

North America to continue to dominate the global pharmaceutical market; Asia-Pacific to post fastest growth rate

North America is the largest pharmaceutical market in the world in terms of consumption, at ~$587 billion as of 2020, followed by Europe and Asia-Pacific at ~$338 billion and ~$270 billion, respectively.

Figure 36: Region-wise segmentation of global pharmaceutical market (consumption)

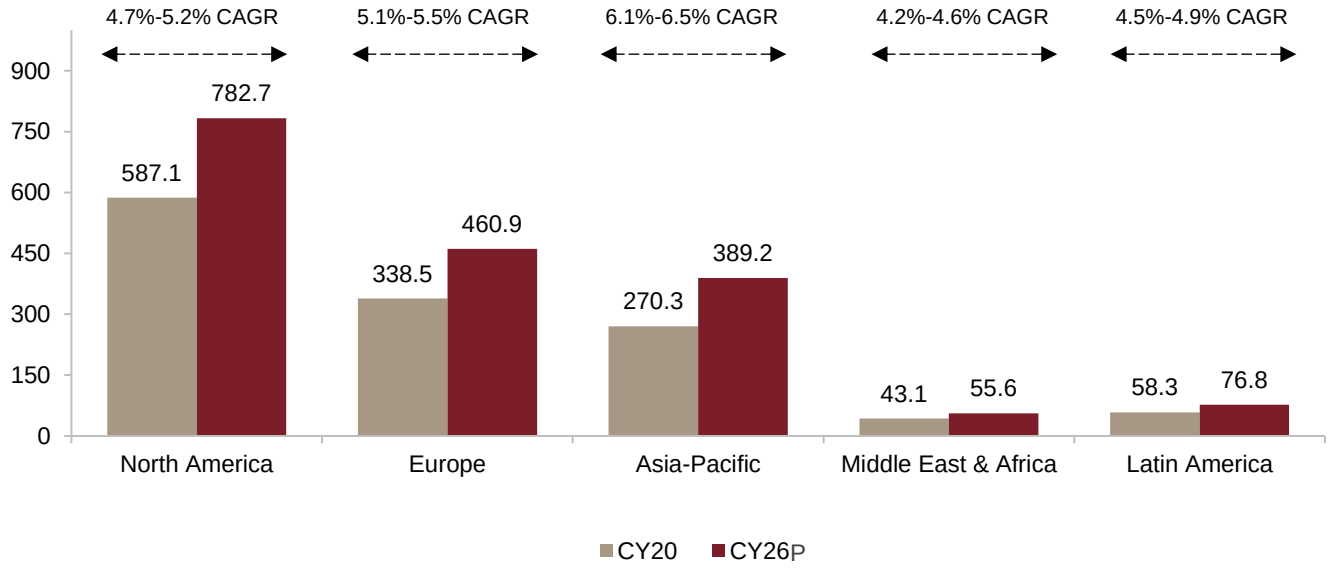


P: Projected

Source: Mordor Intelligence, CRISIL Research

Figure 37: Region-wise global pharmaceuticals market outlook

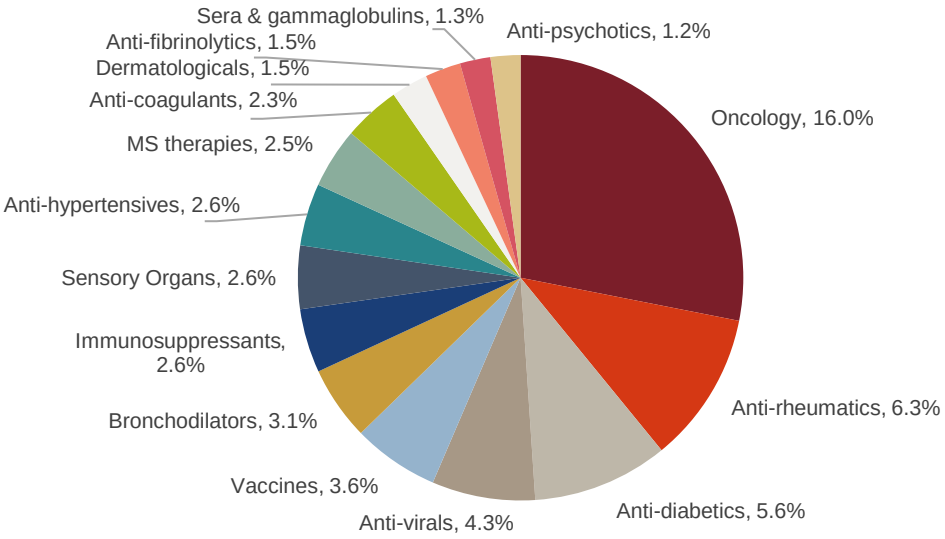
($ billion)



Source: Mordor Intelligence, CRISIL Research

Therapy-wise share in global pharmaceutical market

Figure 38: Therapy-wise share of global pharmaceutical market by value (2021)



Source: Industry reports, CRISIL Research

Key growth drivers for global pharmaceutical industry

Rise in ageing population

According to the United Nations' World Population Prospects: The 2019 Revision, the number of people 65 years or above is expected to more than double by 2050 globally, rising from 703 million in 2019 to 1.5 billion. This population group is registering a faster growth rate than all the younger age groups, which will support the healthcare segment, as the incidence of chronic diseases is high in this age group.

Incidence of chronic diseases

Rising incidences of cancer, cardiovascular diseases, obesity, and diabetes have significant impact on the economy of a country, which is, therefore, likely to drive demand for pharmaceuticals.

Better access to medicine in emerging markets

As the world's population topped 7.7 billion in 2020, per capita usage of medicine per person per day is also estimated to have increased. Much of the increase in usage is from emerging pharmaceutical markets, such as China, India, Brazil, and Indonesia, where substantial increases have been made in average medicine volume usage.

The rise of government safety nets and private insurance are key factors that will increase volume usage across emerging markets. The extent and pace of investments, both public and private, will be a key determinant of continued increase in usage, though.

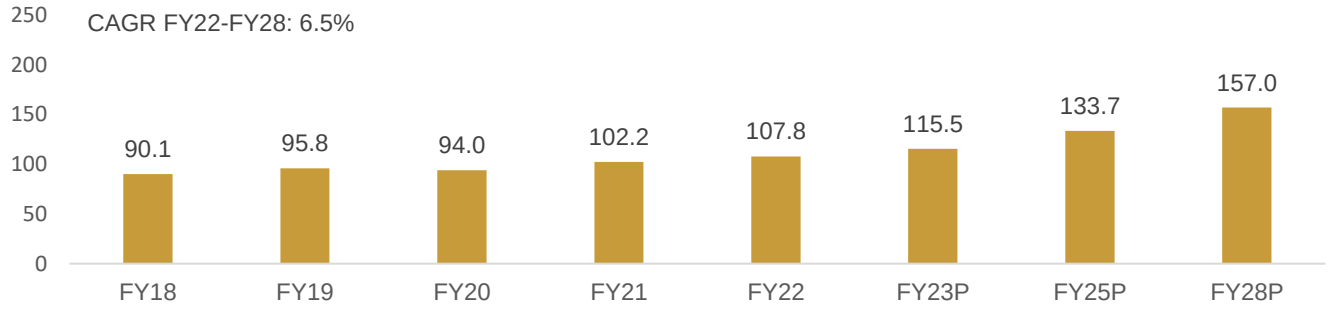
Strong development of generics market

In the US, healthcare reforms are driving higher insurance coverage and greater usage of generic medicines. Driven by greater dependence on generic medicines and enactment of Patient Protection and Affordable Care Act, growth of the market is expected to continue.

The Act, first enacted on March 23, 2010, was aimed at bringing a large section of the population under public and private insurance coverage. The Affordable Care Act (2010) included provisions to ensure that insurance companies do not refuse to cover patients with pre-existing conditions and expanded Medicaid coverage to include more people from low-income groups. The consequent decline in the uninsured population in the US will continue to drive demand for generic drugs, thereby aiding growth of Indian pharmaceutical manufacturers.

BSCL product demand in global pharma industry

Table 12: Global market demand for BSCL products in pharmaceuticals (kilo tonne)



P: Projected

Note – Data for each fiscal year, product demand includes piperazine, EDA and DETA

Source: CRISIL Research

India pharmaceutical industry

Positioning of Indian pharmaceutical industry

The Indian pharmaceutical industry also plays a significant role globally. With over 80 pharma clusters, 10,500 manufacturing facilities, and 500 API manufacturers comprising ~8% share of the global API industry, India is the largest supplier of generic medicines, with 20% share of global supply; the country manufactures 60,000 different generic brands across 60 therapeutic categories, and exports these to over 200 countries. The country also has the highest number of US Food and Drug Administration (USFDA)-compliant pharma facilities outside the US.

In fact, the Indian pharmaceutical industry is currently ~$50 billion, thereby ranking third in terms of volume and 14th in terms of value. Behind India's pharma success story is world-class manufacturing facilities, robust infrastructure, cost-competitiveness, trained human capital, and innovation. In fact. 65-70% of WHO’s vaccine requirements are sourced from India.

Indian pharmaceutical industry structure

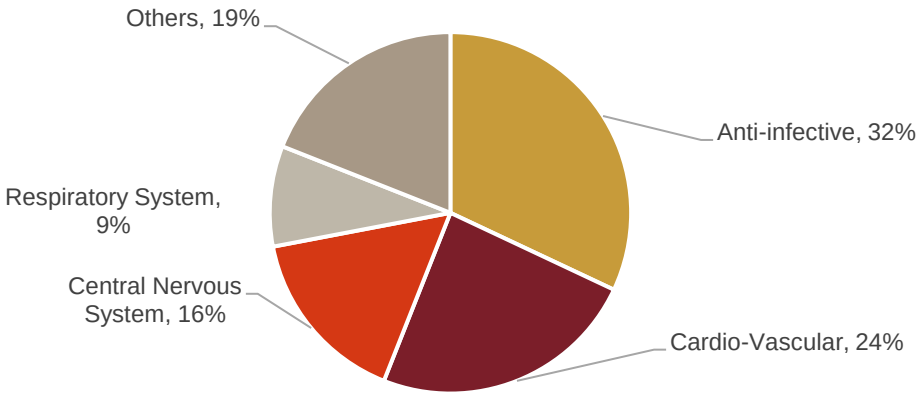
The pharmaceuticals sector is a non-cyclical industry, comprising formulations, bulk drugs, and chemicals/intermediates.

Pharmaceutical value chain

Source: CRISIL Research

- **Pharmaceutical intermediates:** An API/bulk drug is generally synthesised through complex step-wise chemical reactions. The intermediates are chemical compounds that are used to develop stable APIs; are key building blocks for APIs. As per Pharmaceutical Export Promotion Council of India, intermediates are used as raw materials to produce bulk drugs, which are either sold directly or retained by companies to produce formulations. These intermediates are generally organic compounds, often manufactured from specialty chemicals through specific chemical processes, and then used in the synthesis of different API classes, such as antibiotics, vitamins, steroids, analgesics, etc
- **Bulk drugs or APIs**: These are the main constituents of formulations, which have the desired pharmaceutical property. These serve as the main raw materials for formulations. Players manufacturing APIs supply to formulation players, who, in turn, sell the final dosage forms that can contain one or more API. The API industry can be segregated based on their application as anti-infective, cardiovascular, central nervous system, or respiratory system drugs

Figure 39: API market by application (2021)

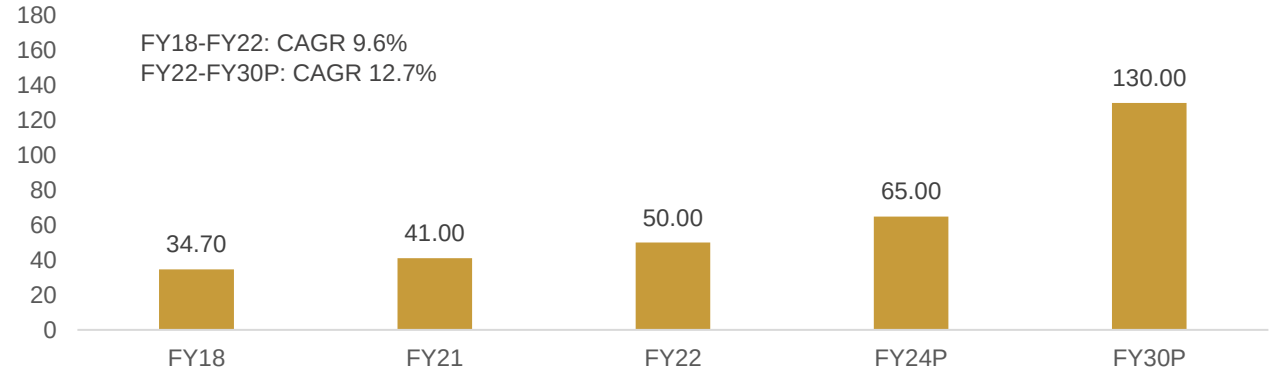


Source: CRISIL Research

- **Formulations**: Final medicines are sold in the form of capsules, tablets, injectables, etc. These formulations are manufactured by combining one or more API, together with excipients, which serve as inert masking, binding or carrier substance. The dosage forms are chosen as per requirements

Over the next five years (fiscals 2021 to 2026), the domestic pharmaceuticals market is expected to grow at a steady pace on the back of vaccine manufacturing, growing opportunities in API manufacturing, US markets turning favourable with focus on specialty drugs, complex molecules, and rising demand in the Indian market owing to an ageing population, increasing incidence of non-communicable diseases (NCDs), improving insurance penetration, booming medical tourism, and rising per capita income.

Figure 40: India pharmaceutical industry development ($ billion)



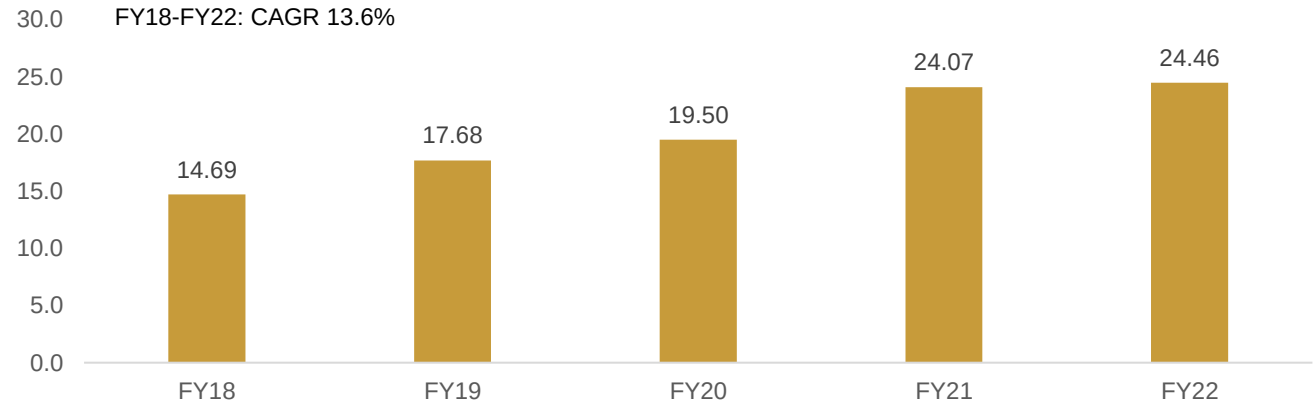
P: Projected

Source: Department of Pharmaceuticals, RBI, CRISIL Research

India pharmaceutical exports development

Building on the buoyant performance in fiscal 2021, Indian pharma exports once again registered a healthy trajectory in fiscal 2022 despite global trade disruptions and fall in demand for Covid-19-related medicines with the abating of infections rates. In fact, exports in fiscal 2022 was the pharma sector's best export performance. Between fiscals 2014 and 2022, Indian pharma exports rose from $12 billion to $24.5 billion, at CAGR of 9.3%.

Figure 41: India pharmaceutical export development ($ billion)



Source: Department of Pharmaceuticals, CRISIL Research

Overview of government initiatives in Indian pharmaceuticals sector

On March 21, 2020, the Union Cabinet approved two schemes to support the Indian pharmaceuticals sector.

Name of the scheme	Details
Production-linked Incentive	• Tenure: FY21-FY30 • Financial outlay: Rs 69.4 billion • Scheme applicable for greenfield projects • Financial incentive to be provided for 41 identified key products that cover all 53 identified APIs • The net worth of the applicant (including that of group companies) as on date of application should be >=30% of total proposed investment • Maximum number of selected applicants: 136 • The incentive under the scheme shall be applicable only on sales of eligible product to domestic manufacturers
Creation of bulk drug parks	• Tenure: FY21-FY25 • Financial outlay: Rs 30 billion • Three bulk drug parks to get the support • Maximum grand-in-aid for one bulk drug park will be limited to Rs 10 billion • Minimum 50% of land area for bulk drug manufacturing units • Three states to be selected through challenge method

Source: PIB, CRISIL Research

Table 13: The list of products eligible for the PLI scheme

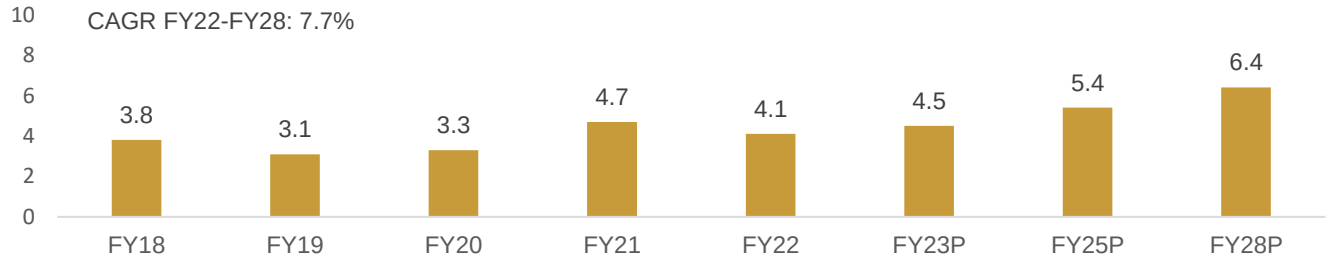
S No	List of identified products	S No	List of identified products
1	Amoxicillin	28	Ciprofloxacin
2	Azithromycin	29	Losartan
3	Erythromycin Stearate/	30	Telmisartan
4	Ceftriaxone	31	Artesunate
5	Cefoperazone	32	Norfloxacin
6	Cefixime	33	Ofloxacin
7	Cephalexin	34	Metronidazole
8	Piperacillin Tazobactam	35	Sulfadiazine
9	Sulbactam	36	Levofloxacin
10	Dexamethasone	37	Meropenem
11	Prednisolone	38	Paracetamol
12	Metformin	39	Tinidazole
13	Gabapentin	40	Ornidazole
14	Rifampicin	41	Ritonavir
15	Vitamin B1	42	Diclofenac Sodium
16	Vitamin B6	43	Aspirin
17	Clindamycin Phosphate	44	Levetiracetam

18	Clindamycin HCL	45	Carbidopa
19	Streptomycin	46	Levodopa
20	Neomycin	47	Carbamazepine
21	Gentamycin	48	Oxcarbazepine
22	Doxycycline	49	Valsartan
23	Potassium Clavulanate	50	Olmesartan
24	Oxytetracycline	51	Atorvastatin
25	Tetracycline	52	Acyclovir
26	Clarithromycin	53	Lopinavir
27	Betamethasone		

Source: Department of Pharmaceuticals

BSCL product demand from Indian pharma industry

Table 14: Demand for BSCL products in India pharmaceutical market (kilo tonne)



P: Projected

Note – Data for each fiscal year, product demand includes piperazine, EDA and DETA

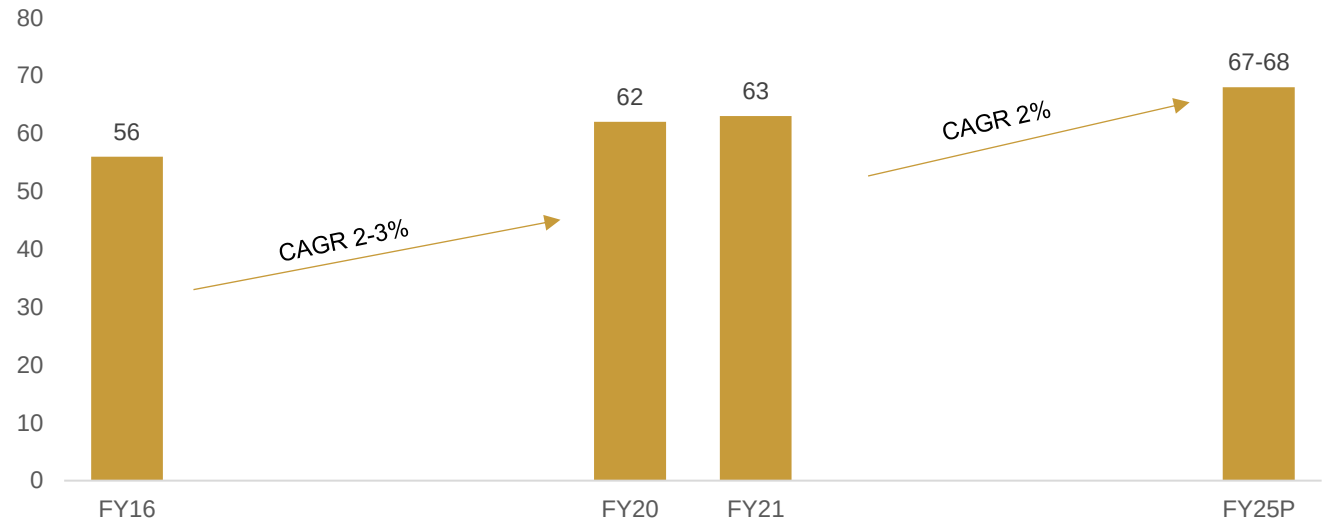
Source: CRISIL Research

6.2 Agrochemicals

Global agrochemicals industry

CRISIL Research estimated the global pesticide industry size to be $63 billion as of 2021. The industry grew at 2-3% CAGR over 2016-2020. Over 2021-2025, the growth expected is 2%. The industry is witnessing consolidation and tight regulation. The importance of sustainability is also growing. Increasingly stringent regulation is impacting growth of established products and increasing the cost of innovation. Generic products have grown consistently over the past 10 years and accounted for 40-41% of the agrochemical market in 2021. The Asia-pacific region accounts for 30-31% of the global pesticide market. Asia and Latin America are the largest regional markets for crop protection chemicals and account for approximately 30% and 25% of global sales, respectively. Europe and North America together account for ~40%.

Figure 42: Global pesticide industry market size ($ bn)



P: Projected

Source: CRISIL Research

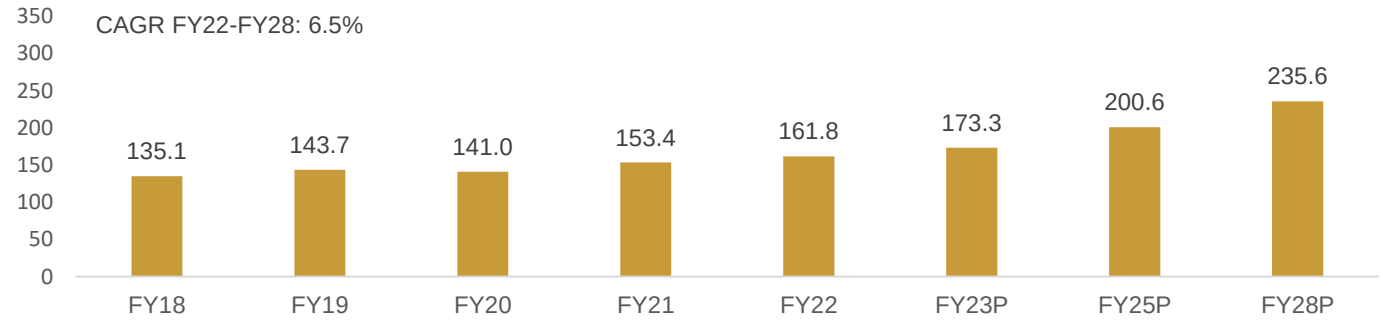
Note – Data for each fiscal year

Global market size of agrotechnical – Mancozeb

Mancozeb, (ethylene-bis-dithiocarbamate), commercially known as diathan-M, is an important fungicide useful against a wide range of fungus affecting ornamental plants, crops, and fruits. It is a combination of two other dithiocarbamates: maneb and zineb. Mancozeb came under scrutiny recently but is not banned in India, unlike in some parts of Europe.The global production capacity of mancozeb is more than 250 kilo tonne. UPL is the largest manufacturer of mancozeb globally. The top five manufacturers are UPL, Corteva, Limin Chemical, Coromandel International, and Indofil Industries. They account for more than 70-80% of the global market share.

BSCL product demand from global agrochemical industry

Table 15: Global market for BSCL products in agrochemicals (kilo tonne)



P: Projected

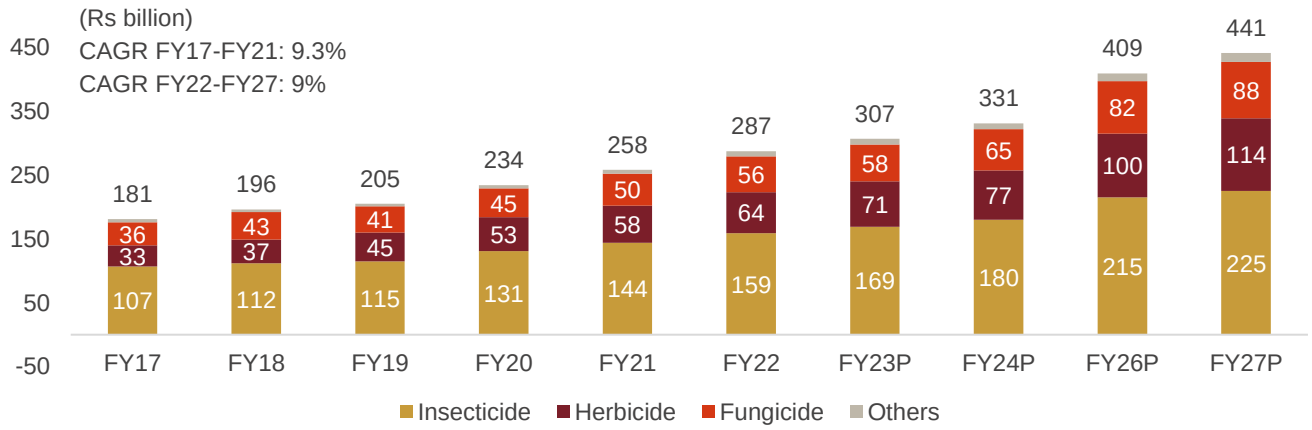
Note – Data for each fiscal year, product demand includes EDA

Source: CRISIL Research

6.3 India agrochemicals industry

Generics dominate the Indian agrochemicals business. Over the next three years, assuming normal monsoons, we expect domestic consumption of agrochemicals to log 8-10% CAGR to cross Rs 400 billion by fiscal 2026. The growth will be driven by an increase in penetration and rise in per-hectare expenditure on pesticides. Further, the usage is expected to increase because of rising farmer awareness. India has one of the lowest per-hectare consumption of agrochemicals. Therefore, farmers are likely to increase the intensity of application to achieve better crop yields and pare losses.

Figure 43: Indian pesticide industry development



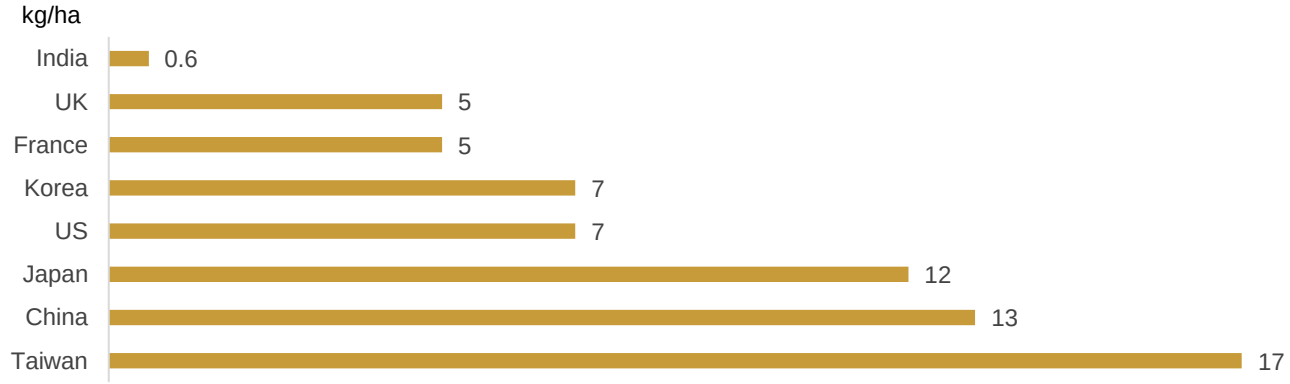
P: Projected

Source: CRISIL Research

India's consumption far below global level

Despite the rapid growth in recent years, pesticide usage in the country is much below the global standards. Though overall pesticide penetration has been increasing driven by the rise in per-hectare penetration and usage, India's agrochemical usage is very low compared with other countries (developed and developing).

Figure 44: Comparison of pesticide usage in various countries



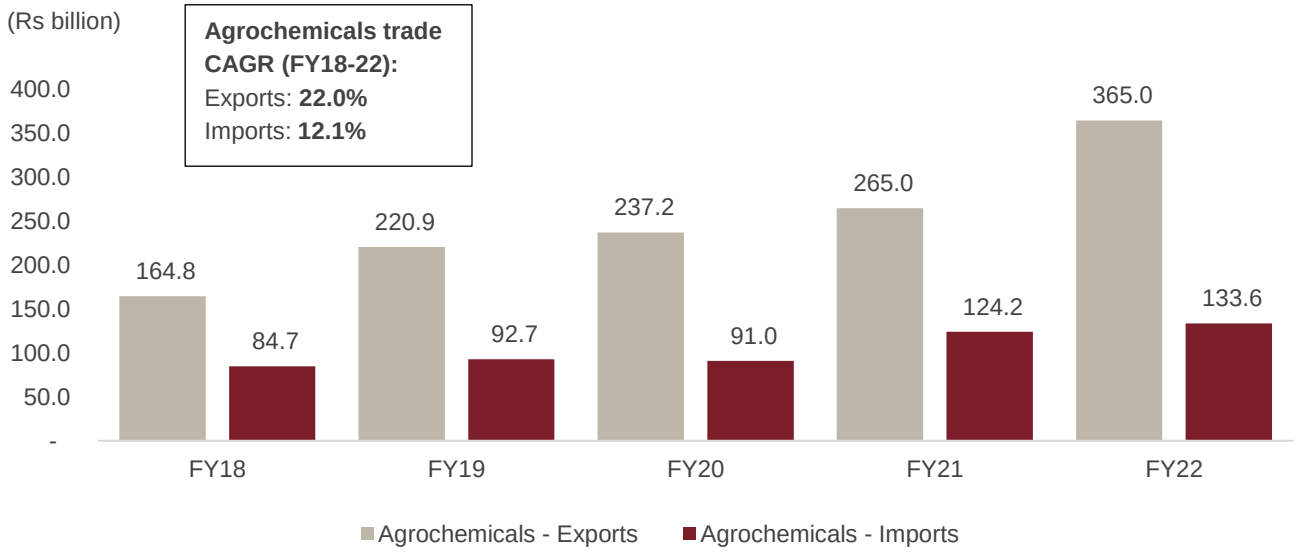
Source: Industry, CRISIL Research

India’s agrochemicals exports logged 22% CAGR in past five years

In the past fiscal, the country’s total agrochemical exports stood at Rs 364.9 billion and imports Rs 133.6 billion. Agrochemicals accounted for 1.16% of the total merchandises exports and 0.29% of the total merchandise imports

in the year. Between fiscals 2018 and 2022, exports of these products logged a robust 22% CAGR and imports a 12.1% CAGR.

Figure 45: India's agrochemicals trade over fiscals 2018-2022



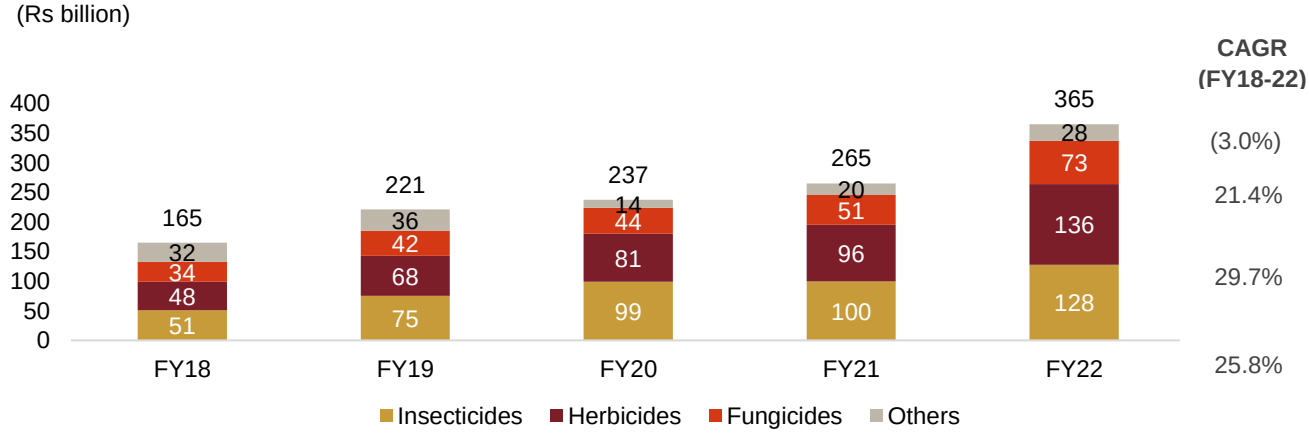
Share (%) of agrochemicals in total merchandise trade of India	FY17	FY18	FY19	FY20	FY21	FY22
Exports	0.78%	0.84%	0.96%	1.07%	1.23%	1.16%
Imports	0.27%	0.28%	0.26%	0.27%	0.43%	0.29%

Source: DGCIS, CRISIL Research

~70% of agrochemicals produced in India was exported in fiscal 2022

Brazil, the US, and France are major export markets for Indian agrochemicals. The top five countries accounted for 57% of India's agrochemicals exports in fiscal 2022.

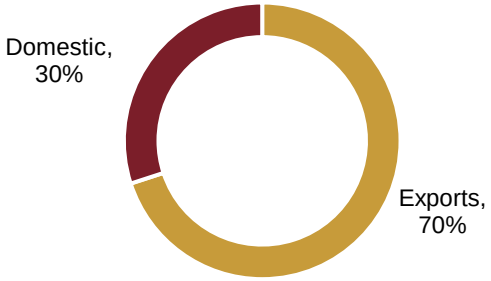
Figure 46: Exports have grown at a healthy pace over the past years



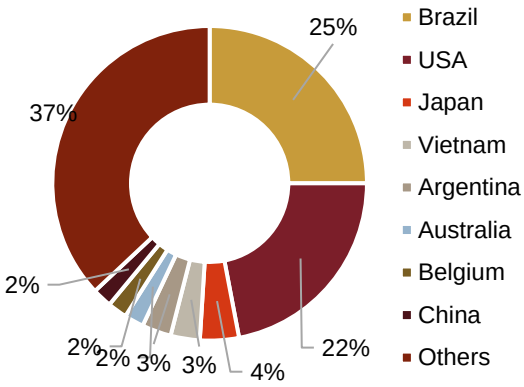
Note: HS codes: insecticides - 380891; fungicides - 380892; herbicides - 380893; others - 380894, 380899, 380869, 380862, 380861, 380859, and 380852

Source: Ministry of Trade and Commerce, CRISIL Research

Share of exports in overall agrochemicals industry



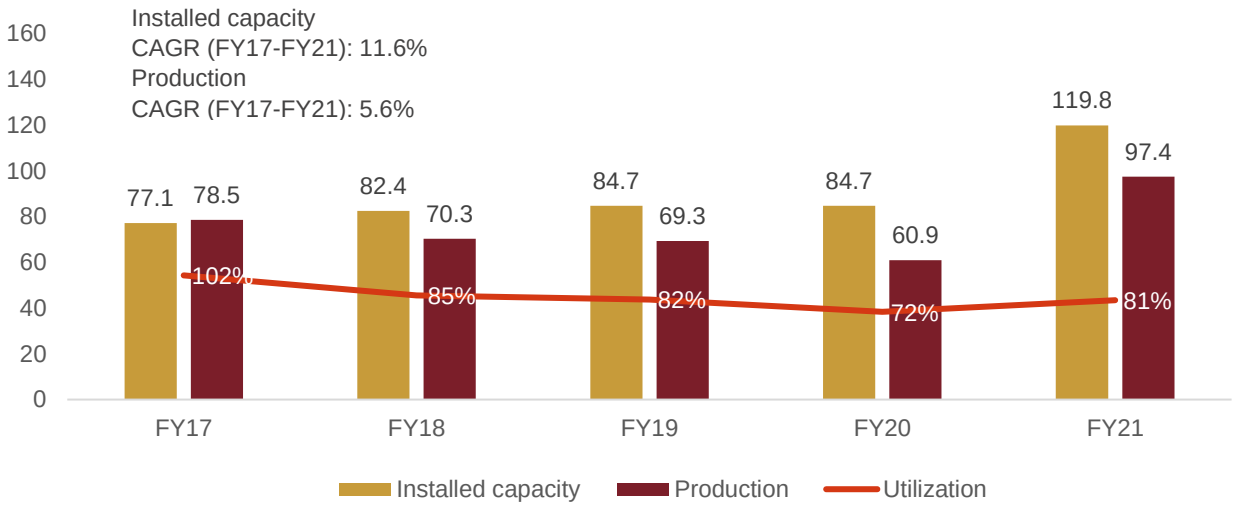
Country-wise break-up (%) of agrochemicals export



Source: Ministry of Trade and Commerce, CRISIL Research

One commonly used pesticide is Mancozeb. As mentioned earlier, it is banned in some parts of Europe but is widely used in India and has no direct substitutes. In India, it is used in the cultivation of crops such as potatoes and grapes, and as an ingredient in the production of several other pesticides.

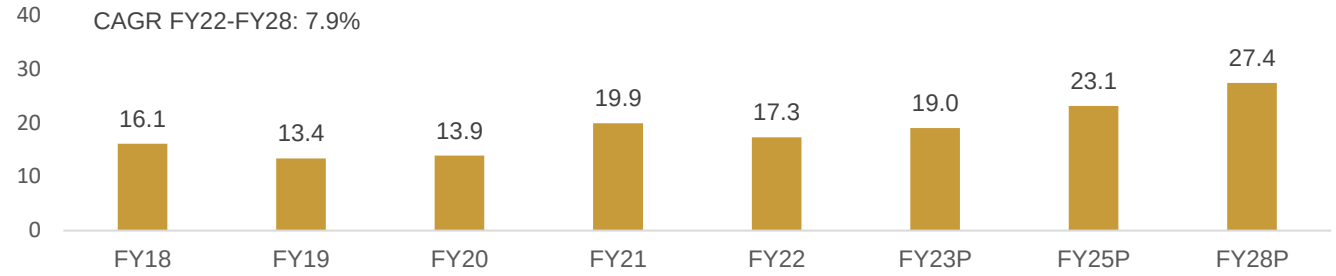
Figure 47: Mancozeb annual capacity, production, and utilisation development ('000 tonne)



Source: Department of chemicals and petrochemicals

BSCL's products' demand from the Indian agrochemical industry

Table 16: Indian market for BSCL products in agrochemicals (in kilo tonne)



P: Projected

Note: Data for each fiscal year, product demand includes EDA

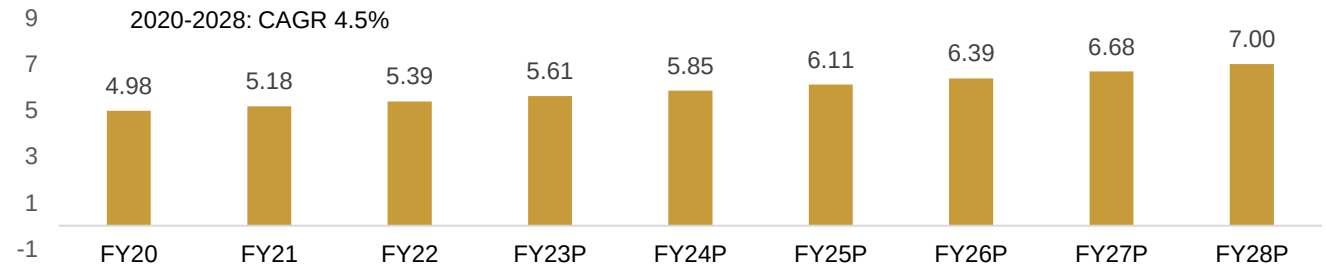
Source: CRISIL Research

6.4 Chelating agents

Industry development

Chelating agents are chemical substances that coordinately form covalent connections with metal ions to produce stable, water-soluble complexes. They are also known as chelators, chelants, or sequestering agents. The most known Chelating Agents are EDTA (Ethylenediamine tetraacetic acid) and their sodium salts and DTPA (Diethylenetriaminepenta acetic acid).Because of their capacity to bond with metals, they have a wide range of uses, including as corrosion inhibitors, cleaning agents for both domestic and commercial settings, bleaching agents for the paper and pulp industry, and additives for the food and beverage industry. It is also useful in applications such as pharma to remove toxic metals from the body, as contrast agents in MRI scanning, in manufacturing using homogeneous catalysts, in chemical water treatment to assist in the removal of metals, and in agrochemicals as metal carriers in micronutrients.

Figure 48: Global market size of chelating agents ($ billion)



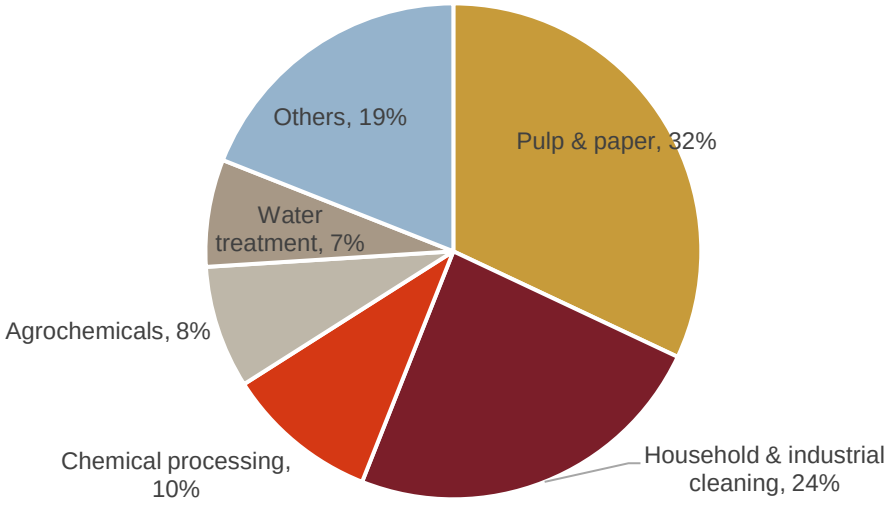
Note: Data for each fiscal year

P: Projected

Source: CRISIL Research

By application, the market is segmented into cleaners, pulp and paper, water treatment, agrochemicals, chemicals, food and beverages, pharmaceuticals, personal care, and other applications. Globally, pulp and paper account for the most with 32% share, followed by household and industrial cleaning with 24%. Other applications where chelating agents are used include agrochemicals, photography, chemical processing, textile treatment and pharmaceuticals.

Figure 49: Chelating agents usage by application (by value), 2021

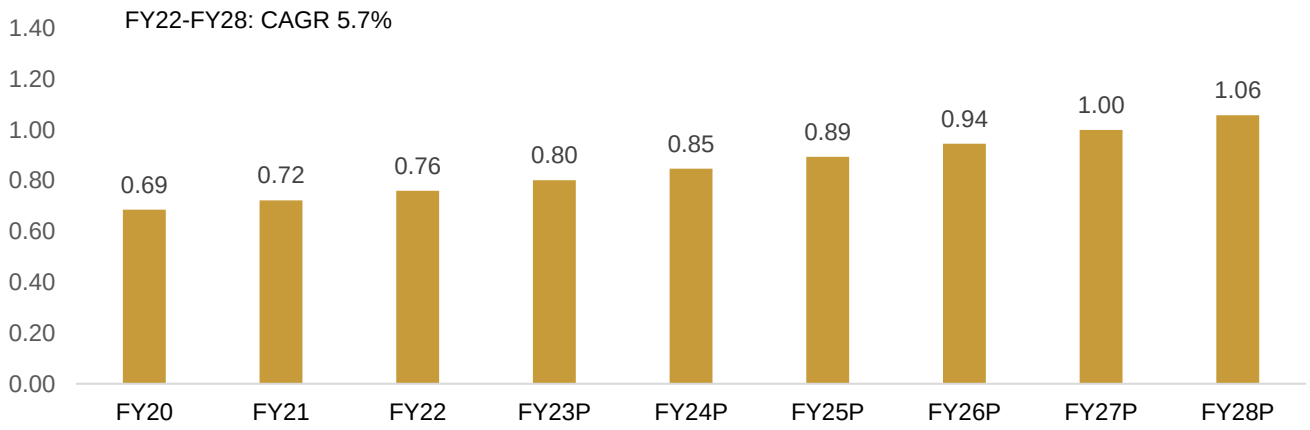


Source: CRISIL Research

Growth drivers for the chelating agents industry

The Asia-Pacific region dominated the world market in 2021 with ~40% market share. The significantly large consumption of chelating agents in the paper and pulp sector, cleaners, wastewater treatment, agrochemicals, and pharmaceutical industry applications across Asian countries is the primary factor driving the growth of the chelating agents industry in the Asia-Pacific. The region is witnessing the fastest growth in the demand for both household and industrial detergents. China and India remain the key markets influencing the demand-supply dynamics in the Asia-Pacific region. The enormous populations of China and India also imply a likely increase in product application of detergents and cleaners made in this region, with a growing awareness of hygiene. Furthermore, the wastewater treatment in the Asia-Pacific region has gained rapid increase with tightening environmental regulations and growing preference for high-quality and safe water in day-to-day life. Rapidly growing food and beverage, pharmaceutical, chemical, and personal care sectors in China, India, and Japan with growing population size and strengthening consumer spending power are driving the demand for chelating agents.

Figure 50: Indian market size of chelating agents ($ billion)



P: Projected

Source: CRISIL Research

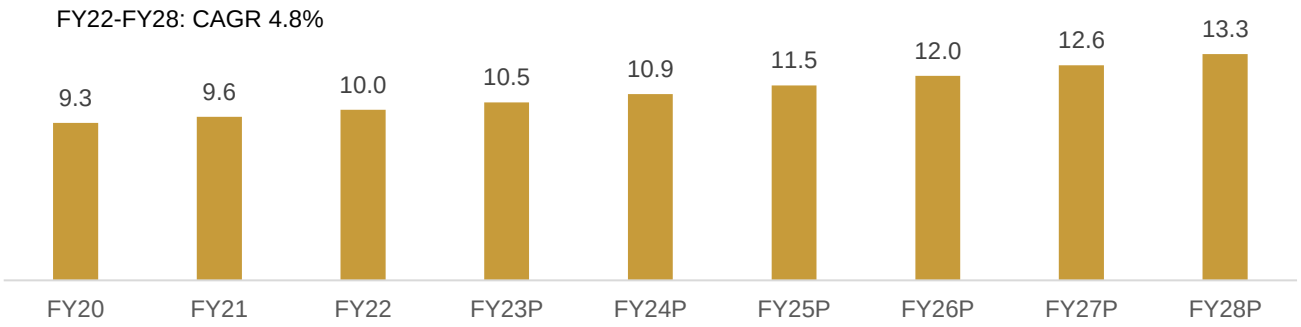
6.5 Oil drilling chemicals

Industry development

Drilling chemicals are mostly employed in operations such as oil and gas exploration, metal and mineral extraction, coal seam gas drilling, and bore well drilling. Drilling chemicals are helpful for maintaining pressure, removing cuttings from bore wells, cooling and lubricating drilling equipment, and supporting and stabilising the region around the bore well.

Diethylenetriamine (DETA) - the most prominent derivative of Ethylenediamine (EDA) and tri-ethylene tetramine (TETA) are used as emulsifiers in drilling fluids. DETA-based corrosion inhibitors work by adhering to metal surfaces (e.g., tubing, piping, tanks) and protecting them from corrosion due to chlorides or free acids. DETA is an analog of diethylene glycol. It is used as a solvent for the extraction of sulfur and acid gas in the oil industry. EDTA controls the reactivity of metal ions by forming strong, water-soluble complexes that prevent undesirable precipitation, dissolve scale deposits and optimise oxidation processes.

Figure 51: Global market size of oil drilling chemicals ($ billion)



Note: Data for each fiscal year

P: Projected

Source: CRISIL Research

6.6 Key growth drivers

Global

Investments in energy and mineral exploration to drive growth

Major investments in energy and mineral exploration are largely responsible for the rising use of drilling chemicals. As emerging economies are becoming more urbanized and industrialized, there is a rising demand for basic and precious metals, and oil and gas. Increasing crude oil and shale gas exploration activities have paved the way for more oil & gas drilling operations, thereby expanding the global drilling chemicals market.

Oil supply to increase in 2022, led by easing of production cuts by Opec+ members

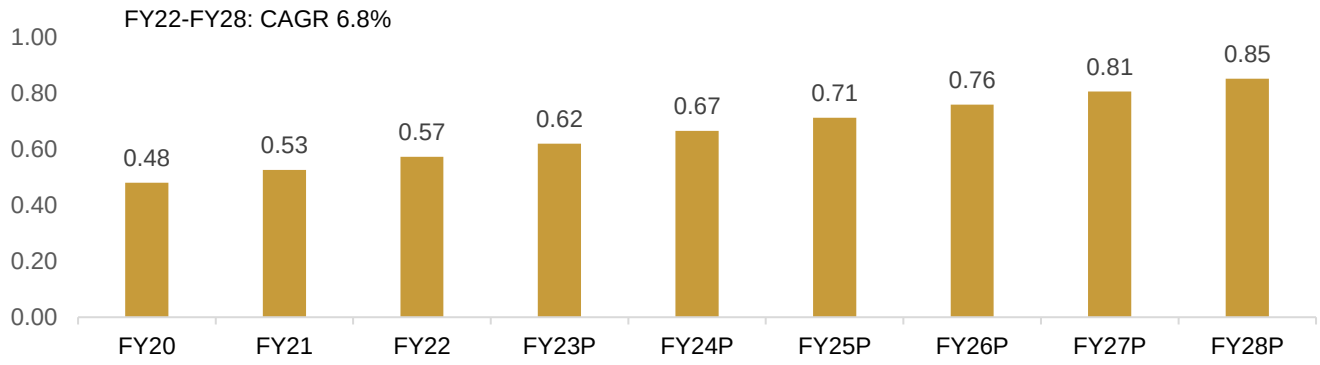
Global oil supply is expected to increase 5-6 mbpd in 2022 led by easing of supply by the Opec+ members. Furthermore, production from Shale oil is also expected to remain high driven by favorable cost economics. The current unrest in Libya, Kazakhstan and geo-political tensions between Russia and Ukraine may restrict sharp rise in supply. Therefore, regional demand-supply imbalances may result in prices remaining at elevated levels. CRISIL Research projects global supply of crude oil rise to remain gradual during the five-year forecast period. We expect supply to increase by 5-5.5 million barrels per day (mbpd) between calendar years 2019 and 2026.

India

Favourable government policy to encourage investments for gas extraction from deep water fields

The Indian government's steps to attract investments and improve production through the new gas-pricing mechanism, by giving pricing freedom for gas produced from high-pressure, high-temperature, deep-water and ultra-deep-water areas is expected to expedite the development of fields.

Figure 52: Indian market size of oil drilling chemicals ($ billion)



P: Projected

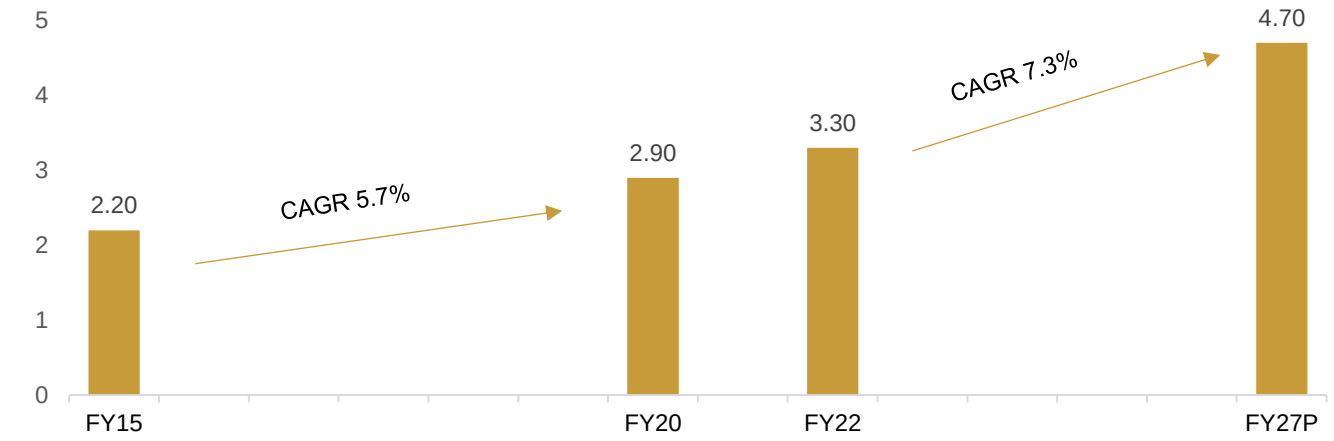
Source: CRISIL Research

6.7 Other key applications

Surfactants

Increasing penetration of products such as cleaning agents and detergents is expected to drive strong growth in this segment.

Figure 53: Market size for surfactants in India ($ billion)



P: Projected

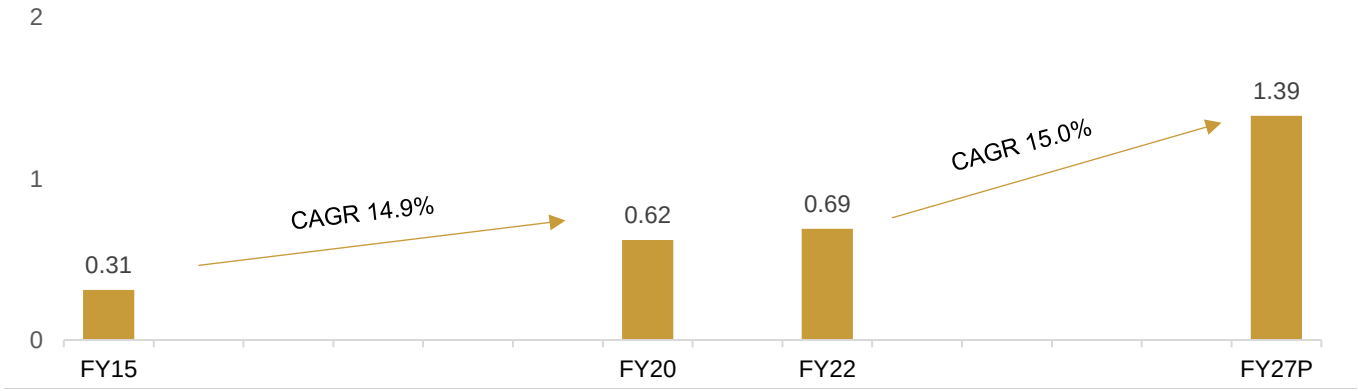
Source: CRISIL Research

Water treatment chemicals

Tightening of environmental norms on industrial effluents and strict implementation to fuel growth

The creation of infrastructure for waste management such as sewerage network and sewage treatment facilities have not kept pace with the burgeoning population, leading to a gap in sewage generation and treatment capacity across states. Tighter environmental norms, long-term investments in water treatment facilities as well as cleaning and desilting initiatives aimed at the nation's major rivers will fuel the sector's significant growth in India.

Figure 54: Market size for water treatment chemicals in India ($ billion)



P: Projected

Source: CRISIL Research

7 Financial benchmarking

CRISIL Research has compiled profiles of key players in the specialty chemicals industry in India (see table below). Information in this section is sourced from company websites including annual reports and investor presentations, regulatory filings, rating rationales and/or product brochures. The competitive landscape has been established based on player operations in India, comparable operating revenue, and financial data availability for players.

Table 17: Financials for fiscal 2022

Key Financial Parameters	Units	Balaji Specialty Chemicals	Clean Science and Technology	Alkyl Amines	Tatva Chintan	Neogen Chemicals
Revenue from operations						
FY22	Rs million	5,142.80	6,848.86	15,428.00	4,336.47	4,872.50
FY21	Rs million	1,744.01	5,124.28	12,424.40	3,003.59	3,364.10
FY20	Rs million	538.81	4,193.00	9,928.77	2,632.39	3,061.21
Revenue CAGR (FY20–FY22)	%	208.95%	27.80%	24.65%	28.35%	26.16%
Operating EBITDA						
FY22	Rs million	1,806.20	2,998.88	3,265.10	1,082.39	867.70
FY21	Rs million	438.37	2,589.54	4,291.30	664.36	647.40
FY20	Rs million	4.35	1,852.96	2,806.32	549.52	581.73
Operating EBITDA CAGR (FY20–FY22)	%	1,937.69%	27.22%	7.86%	40.35%	22.13%
PAT						
FY22	Rs million	1,089.45	2,284.95	2,248.90	958.74	446.30
FY21	Rs million	103.95	1,983.80	2,953.40	522.62	313.30
FY20	Rs million	(158.70)	1,396.51	2,152.81	377.89	286.56
PAT CAGR (FY20-FY22)	%	NA	27.91%	2.21%	59.28%	24.80%
Shareholder' Equity (Net worth)						
FY22	Rs million	1,874.79	7,684.49	9,898.00	4,730.89	4,393.20
FY21	Rs million	785.32	5,396.67	7,924.60	1,659.64	1,830.10
FY20	Rs million	681.33	3,424.50	5,365.96	1,176.94	1,562.45
Net Debt						
FY22	Rs million	1,632.30	(2,658.01)	(145.70)	569.21	919.80
FY21	Rs million	2,024.60	(2,477.94)	(798.14)	857.67	2,091.20
FY20	Rs million	2,020.63	(1,386.85)	174.11	690.42	1,409.21
Current Assets						
FY22	Rs million	2,117.22	5,703.16	5,375.70	4,358.85	4,924.60
FY21	Rs million	978.05	3,951.37	5,279.20	1,842.50	2,401.60
FY20	Rs million	848.07	2,562.66	2,941.46	1,326.99	2,310.61

Current Liabilities						
FY22	Rs million	736.79	1,349.06	3,279.20	1,714.33	2,181.00
FY21	Rs million	582.08	1,019.76	2,817.98	1,180.15	1,779.40
FY20	Rs million	672.43	769.91	1,538.12	876.50	1,498.66
Total Assets						
FY22	Rs million	4,016.10	9,246.73	13,713.30	6,583.01	7,992.60
FY21	Rs million	3,030.44	6,599.17	11,453.30	3,148.03	4,919.60
FY20	Rs million	3,042.44	4,302.35	7,833.84	2,489.38	3,548.50
Total Equity and Liabilities						
FY22	Rs million	4,016.10	9,246.73	13,713.30	6,583.01	7,992.60
FY21	Rs million	3,030.44	6,599.17	11,453.30	3,148.03	4,919.60
FY20	Rs million	3,042.44	4,302.35	7,833.84	2,489.38	3,548.50

Key Financial Parameters	Units	Balaji Specialty Chemicals	Clean Science and Technology	Alkyl Amines	Tatva Chintan	Neogen Chemicals
EBITDA Margins						
FY22	%	35.12%	43.79%	21.16%	24.96%	17.81%
FY21	%	25.14%	50.53%	34.54%	22.12%	19.24%
FY20	%	0.81%	44.19%	28.26%	20.88%	19.00%
PAT Margins						
FY22	%	21.11%	31.96%	14.44%	21.66%	9.14%
FY21	%	5.91%	36.87%	23.64%	17.10%	9.31%
FY20	%	(29.33%)	32.46%	21.53%	14.28%	9.36%
RoAE						
FY22	%	81.91%	34.93%	25.24%	30.01%	14.34%
FY21	%	14.18%	44.98%	44.44%	36.85%	18.47%
FY20	%	(20.86%)	45.43%	47.02%	38.29%	25.31%
RoACE						
FY22	%	53.12%	54.70%	29.92%	18.88%	14.13%
FY21	%	11.89%	82.83%	56.14%	23.72%	14.75%
FY20	%	(2.70%)	84.21%	45.80%	26.86%	17.81%
Gross Debt-Equity Ratio						
FY22	times	0.89x	0.00x	0.02x	0.25x	0.47x
FY21	times	2.60x	0.00x	0.06x	0.54x	1.15x
FY20	times	2.99x	0.01x	0.09x	0.67x	0.91x
Net Debt to Equity Ratio						
FY22	times	0.87x	n.a.	n.a.	0.12x	0.21x
FY21	times	2.58x	n.a.	n.a.	0.52x	1.14x
FY20	times	2.97x	n.a.	0.03x	0.59x	0.90x

Net Debt to EBITDA Ratio						
FY22	times	0.90x	n.a.	n.a.	0.53x	1.06x
FY21	times	4.62x	n.a.	n.a.	1.29x	3.23x
FY20	times	464.51x	n.a.	0.06x	1.26x	2.42x
EPS						
FY22	times	5.45	21.51	44.04	44.59	18.70
FY21	times	0.52	18.68	57.90	26.02	13.45
FY20	times	(0.79)	13.15	105.50	18.81	12.28
Inventory Days						
FY22	days	13.56	37.58	33.88	101.84	115.59
FY21	days	34.36	31.16	30.20	82.38	132.31
FY20	days	125.84	31.17	34.81	68.74	120.57
Receivable Days						
FY22	days	69.16	60.69	59.71	62.01	70.43
FY21	days	75.87	51.31	57.61	85.26	83.42
FY20	days	113.68	56.41	58.24	62.97	81.01
Payable Days						
FY22	days	24.43	116.45	85.21	65.03*	87.57*
FY21	days	60.33	124.08	81.79	97.85	102.40
FY20	days	108.18	83.21	76.86	63.81	59.62
Working Capital Days						
FY22	days	58.29	(18.18)	8.38	98.82	98.45
FY21	days	49.90	(41.62)	6.02	69.78	113.33
FY20	days	131.35	4.37	16.19	67.89	141.97
Debt Service Coverage Ratio						
FY22	times	1.96x	1724.90x	9.84x	5.94x	1.21x
FY21	times	0.91x	86.55x	7.41x	2.80x	1.24x
FY20	times	0.04x	825.14x	8.00x	3.68x	0.94x
Interest Service Coverage Ratio						
FY22	times	10.83x	1,870.54x	76.18x	20.71x	3.94x
FY21	times	1.72x	2,656.58x	63.20x	14.19x	4.20x
FY20	times	(0.45x)	1,418.12x	247.53x	12.71x	4.44x
Total Assets Turnover Ratio						
FY22	times	1.46x	0.86x	1.23x	0.89x	0.75x
FY21	times	0.57x	0.94x	1.29x	1.07x	0.79x
FY20	times	0.19x	1.11x	1.28x	1.21x	1.02x
Net Fixed Assets Turnover Ratio						

FY22	times	2.65x	2.39x	2.36x	3.10x	1.84x
FY21	times	0.85x	2.54x	2.48x	2.68x	1.96x
FY20	times	0.26x	2.84x	2.32x	3.20x	3.23x

Note: Based on Consolidated financial data and Standalone financial data, if consolidated financials not applicable.

Source: CRISIL Research

Note: Formulas Used:

Revenue from Operations = Net revenue excl other income

Operating EBITDA = PBT+ D&A + Interest Cost - Other Income

Shareholders' Equity (Networth) = Share Capital + Reserves & Surplus

Net Debt = Long term debt+ Short term debt - Cash & cash equivalent - Short term investment

EBITDA Margins (%) = Operating EBITDA/ Revenue from Operations

PAT Margins (%) = PAT/ Total Revenue

RoAE = PAT/ Average Shareholders' Equity (Networth)

RoACE = EBIT divided by Average Capital Employed. (Capital Employed is calculated as Shareholder Equity + Long term debt + Short Term Debt - Cash and cash equivalents - Short term investments.)

Gross Debt Equity Ratio = Long Term Debt + Short Term Debt / Shareholders Equity (Networth)

Net Debt to Equity Ratio = Long term debt+ Short term debt - Cash & cash equivalent - Short term investment/ Shareholders Equity (Networth)

Net Debt to EBITDA Ratio = Long term debt+ Short term debt - Cash & cash equivalent - Short term investment/ Operating EBITDA

Inventory Days = Average Inventory / Revenue from Operations *365

Receivable Days = Average Receivables/ Revenue from Operations *365

Payable Days = Average Payables / Purchases *365

Working Capital Days = Receivables days + Inventory Days - Payable Days

Debt Service Coverage Ratio = PAT + D&A + Finance Cost / (Interest Paid + Leases+ Principal Repayments)

Interest Service Coverage Ratio = EBIT/ Finance Cost

Total Assets Turnover Ratio = Revenue from Operation / Average Total Assets

Net Fixed Assets Turnover Ratio = Revenue from Operations / Average Net Fixed assets (inc CWIP)

* For computation of payable days, cost of material is considered instead of purchases due to lack of information in the financial statements.

Balaji Specialty Chemicals' financial positioning

- Revenue from operations has grown significantly in the past couple of fiscals, growing almost 9.6x over fiscal 2020 to fiscal 2022
- Operating EBITDA has also increased significantly to record the highest on-year growth among all peers between fiscals 2020 and 2021
- Operating EBITDA margins have strengthened to 35.12% in in fiscal 2022 over 25.14% in fiscal 2021
- The company's capital efficiency has improved, highlighted by the improvement in RoACE (11.89% to 53.12%) over fiscal 2021 to fiscal 2022
- The company has recorded a positive net income right from its second year of operations (fiscal 2021)

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