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Structural Transformation and Growth Dynamics of the Indian Chemical Industry: A Data-Driven Analysis

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Abstract:

This paper examines the structural evolution, market expansion, and investment dynamics of the Indian chemical industry from an engineering and economics perspective. The study reviews production trends, specialty chemical growth, petrochemical capacity, and the contribution of integrated investment regions to industrial concentration. It evaluates the sector's global standing, export orientation, and increasing participation of multinational corporations beside strong domestic enterprises. The analysis highlights the role of growing economics, skilled manpower, research infrastructure, and process engineering capability in strengthening manufacturing competitiveness. Demand drivers from agriculture, construction, automotive, healthcare, and packaging industries are assessed to understand consumption patterns. Policy initiatives, foreign direct investment provisions, and public private participation are examined as enabling factors for sustained growth. The paper also considers recent mergers, acquisitions, and capacity expansion projects that reflect strategic consolidation and international outreach. The findings indicate that the Indian chemical industry is transitioning toward higher value production while expanding its presence in global supply chains.

Key Words: Indian Chemical Industry, Petrochemical, Growing Economics, PCPIR

Introduction:

The Indian chemical industry stands among the most diversified industrial sectors in Asia, covering bulk chemicals, petrochemicals, fertilizers, polymers, dyes, agrochemicals, and a rapidly expanding specialty chemicals segment. Its wide product base supports key industries such as pharmaceuticals, automobiles, textiles, construction, and consumer goods. From an engineering perspective, the sector has progressed through improvements in process design, plant efficiency, waste minimization, and energy management systems. Modernization of production facilities and adoption of advanced control technologies have strengthened manufacturing reliability and cost efficiency. One of the most notable trends in recent years is the strong growth in specialty chemicals. Indian manufacturers have gained recognition for custom synthesis, contract manufacturing, and niche chemical formulations. This shift toward high value products has enhanced export competitiveness and reduced dependence on low margin commodity chemicals. India now holds a significant position in selected global chemical supply chains, supplying intermediates and formulations to Europe, North America, and emerging Asian markets. Rising domestic consumption driven by industrial expansion, infrastructure projects, and agricultural demand has further supported production growth.

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Increasing investments in capacity expansion, research facilities, and integrated chemical parks reflect confidence in long term prospects. Public expenditure on industrial corridors and logistics has improved supply chain efficiency. Policy measures aimed at encouraging domestic manufacturing, rationalizing regulations, and promoting sustainable production practices have opened new opportunities for technological collaboration and foreign direct investment. From an international viewpoint, industrial venues such as Abu Dhabi present strategic relevance. The strength of these industrial centers in hydrocarbon feedstock and petrochemical infrastructure complements India's downstream processing capabilities and expanding specialty chemical expertise. Such cross border industrial cooperation can enhance resource efficiency, technology transfer, and market access. The Indian chemical industry therefore reflects engineering strength, export potential, and growing global integration.

Industrial Diversification and Global Competitiveness

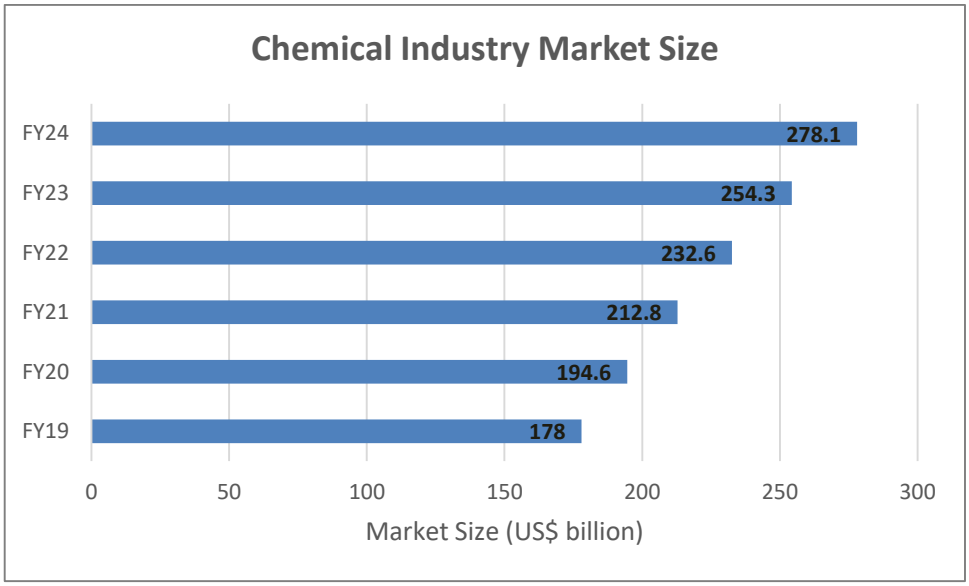
The Indian chemical industry has evolved into one of the most strategically significant pillars of the country's industrial structure. It supplies essential raw materials and intermediates to manufacturing segments such as pharmaceuticals, automotive components, textiles, agriculture, construction materials, and consumer goods. This extensive industrial dependence has encouraged capacity creation, technological upgrade and continuous process improvement across production clusters. As of August 2025, the sector demonstrates remarkable diversification, manufacturing more than 80,000 distinct products and generating employment for over two million people. Such breadth of operations is supported by a robust research framework comprising more than 200 national laboratories and nearly 1,300 R&D centres, strengthening indigenous innovation and applied chemical engineering capabilities.

India holds a significant position in global markets. It ranks as the third largest consumer of polymers, the third largest producer of agrochemicals, and the sixth largest producer of chemicals worldwide. The industry, valued at approximately Rs. 21,50,750 crore in 2024, is projected to reach Rs. 26,25,000 crore by 2025 and is expected to expand substantially by 2040. Policymakers have articulated a 2030 vision to secure a 5 to 6% share of the global chemical value chain, reflecting ambitions to enhance export intensity and manufacturing scale. Specialty chemicals represent a major engine of growth. The segment, valued at US$ 64.5 billion in 2024, is forecast to reach US$ 92.6 billion by 2033. Export prospects remain strong, particularly in agrochemicals and surfactants, with agrochemical exports projected to exceed Rs. 80,000 crore by 2028. India also leads global dye production, accounting for 16 to 18 % of worldwide dyestuff exports and supplying more than 90 countries. Yet, the sector faces contemporary pressures from feedstock price fluctuations, stricter environmental regulations, energy transition demands, and global supply chain realignments. Sustained engineering efficiency, process intensification, and adoption of green chemistry practices will determine its long term competitiveness.

Market Expansion, Production Trends and Industry Structure:

The Indian chemical industry has demonstrated steady expansion in market size, production volumes, and enterprise participation during recent years. Market value increased from US$ 178 billion in FY19 to US$ 278.1 billion in FY24, reflecting sustained industrial demand and improved manufacturing capacity.

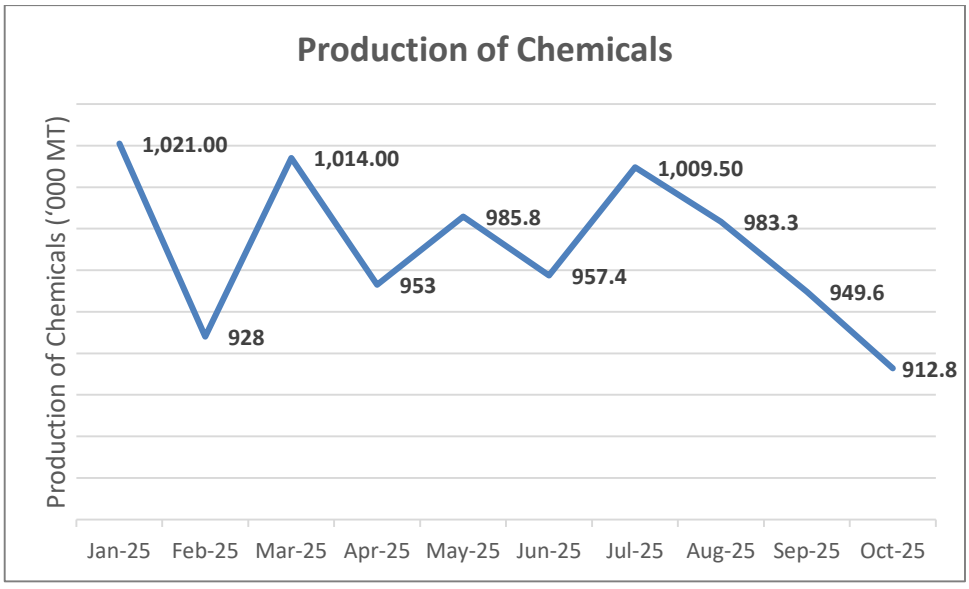
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Source: Department of Chemicals and Petrochemicals, Govt. of India

This upward movement represents consistent year on year growth, supported by infrastructure development, rising polymer consumption, agrochemical demand, and downstream industrial activity. The sector currently contributes about 7% to national GDP and accounts for nearly 2.5 % of global chemical sales, with exports reaching more than 175 countries. India ranks as the sixth largest producer of chemicals globally and third in Asia, indicating its increasing integration into international supply chains.

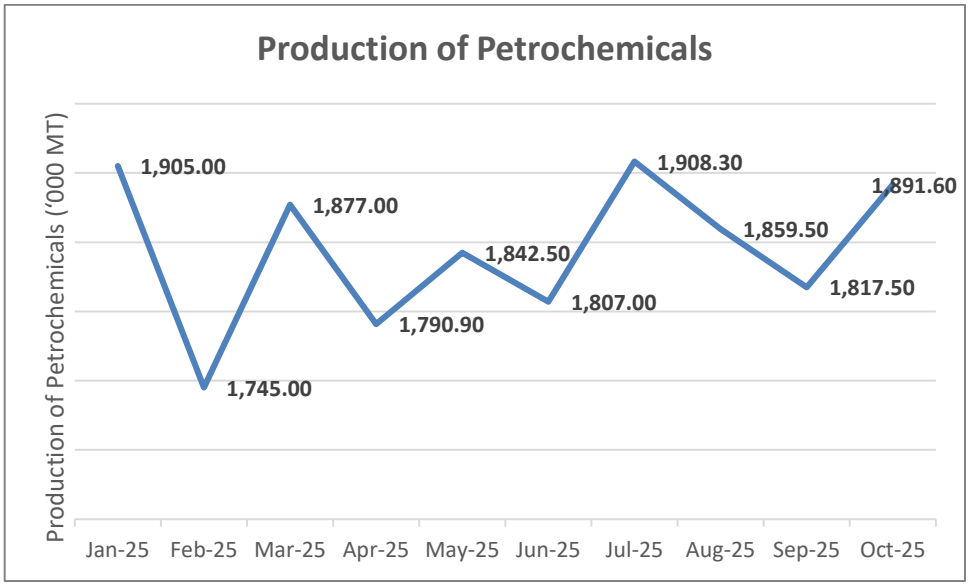
Production data for 2025 indicates stable though moderately fluctuating output levels. Chemical production ranged from 912.8 thousand metric tonnes in October 2025 to 1,021 thousand metric tonnes in January 2025. Monthly variations reflect seasonal demand cycles, maintenance shutdowns, and feedstock adjustments.



Source: Department of Chemicals and Petrochemicals, Govt. of India

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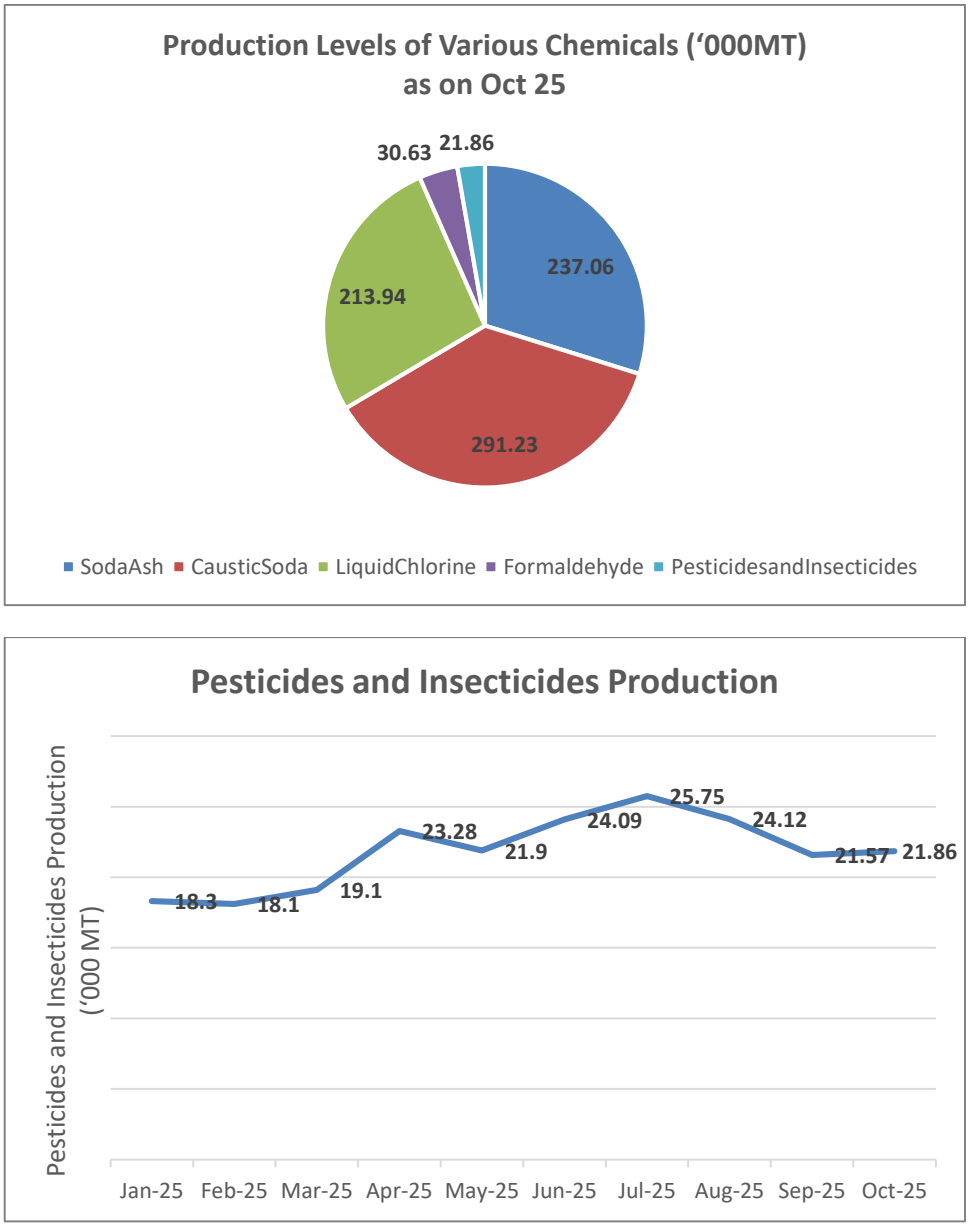
Petrochemical production showed relatively higher volume stability, ranging between 1,745 and 1,908.3 thousand metric tonnes during January to October 2025. This suggests strong operational capacity in polymer and downstream petrochemical units, particularly given India's position as the third largest polymer consumer globally. Long term projections estimate polymer consumption may reach 60 million tonnes by 2040, indicating continued expansion of petrochemical infrastructure.



Source: Department of Chemicals and Petrochemicals, Govt. of India

Segment specific production levels further highlight industrial composition. As of October 2025, soda ash production stood at 237.06 thousand metric tonnes, caustic soda at 291.23 thousand metric tonnes, and liquid chlorine at 213.94 thousand metric tonnes. These bulk chemicals form the backbone of multiple manufacturing processes including glass, detergents, textiles, water treatment, and paper industries. Formaldehyde output reached 30.63 thousand metric tonnes, while pesticides and insecticides recorded 21.86 thousand metric tonnes in October 2025. Monthly pesticide production showed an upward trend during peak agricultural periods, rising from 18.3 thousand metric tonnes in January to a high of 25.75 thousand metric tonnes in July before moderating in subsequent months. This reflects cropping cycles and export dispatch schedules.

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Source: Department of Chemicals and Petrochemicals, Govt. of India

Structural composition of revenue indicates the dominance of large enterprises. In FY22, non SME companies accounted for 70 % of industry revenue, while SMEs contributed 30 %. Large integrated firms benefit from economies of scale, advanced process technologies, and stronger export networks. At the same time, SMEs remain critical for specialty intermediates, contract manufacturing, and region specific supply chains. The industry structure includes prominent domestic firms such as Pidilite Industries Limited, Tata Chemicals Limited, Gujarat Fluorochemicals Limited, Reliance Industries Limited, and United Phosphorus Limited. Their operations span adhesives, polymers, soda ash, specialty fluorochemicals, crop protection solutions, and advanced materials. International participation is equally significant, with companies such as BASF India Limited, E.I. Du Pont India Private Limited, SABIC India Private Limited, ExxonMobil Company India Private Limited, and Mitsubishi Chemical India Private Limited maintaining manufacturing and distribution networks. Their presence strengthens technology diffusion, capital inflow, and global market access. Taken together, the data reflect a sector characterized by scale expansion, diversified product output, strong petrochemical capacity, and growing specialty orientation. Continued investment in process efficiency, feedstock security,

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and environmental compliance will determine the pace at which projected growth targets are achieved.

Future demand indicators remain strong. Chemicals and petrochemicals consumption is expected to approach US$ 1 trillion by 2040. Specialty chemicals, valued at US$ 64.5 billion in 2024, are projected to reach US$ 92.6 billion by 2033. The agrochemicals market, valued at US$ 15.5 billion in 2024, is expected to grow to US$ 23.3 billion by 2033, supported by agricultural modernization and improved crop protection practices. Specialty manufacturers are increasingly pursuing import substitution strategies while expanding export portfolios. Between 2020 and 2024, the sector delivered a five year total shareholder return of 28 %, significantly higher than the global average of 7 %, reflecting strong domestic fundamentals and investor confidence.

Petroleum, Chemicals and Petrochemicals Investment Regions (PCPIR) and Industrial Concentration:

Government of India has approved 4 'Petroleum, Chemicals and Petrochemicals Investment Region (PCPIR)' to promote investment and develop the chemical sector. These PCPIR are located at Dahej, Paradeep, Vishkhapattnam and Cuddalore-Nagapattinam. These regions are attracting good investment and also providing employment. Integrated manufacturing clusters developed under the Petroleum, Chemicals and Petrochemicals Investment Regions policy are central to capacity expansion. These regions are expected to attract nearly Rs. 20 lakh crore, equivalent to about US$ 276.46 billion, by 2035. The integrated cluster approach reduces logistics costs, enhances feedstock availability, supports environmental management systems, and improves economies of scale. Such regional concentration strengthens India's capacity to compete in global petrochemical supply chains while attracting technology transfer and foreign direct investment. The model also encourages co location of feedstock suppliers and specialty manufacturers, strengthening value addition within domestic supply chains. Dahej has attracted comparatively higher investment than other notified zones. The concentration of domestic and multinational enterprises has accelerated cluster based industrial growth. Major firms such as Oil and Natural Gas Corporation, Gujarat Alkalies and Chemicals Limited, ONGC Petro additions Limited, BASF, and LANXESS have established production facilities within this corridor. Infrastructure development has been supported by substantial public investment toward utilities, transport connectivity, and common facilities.

Key Growth Drivers and Strategic Developments:

The following key drivers create a strong foundation for sustained industrial expansion, technological modernization, and deeper global market participation.

- **Expanding Domestic Demand and End Use Industries:**

Rising demand from packaging, construction, automotive, healthcare, and agriculture continues to stimulate chemical consumption. The disinfectants market has witnessed notable growth due to increased hygiene awareness and higher healthcare spending. Expanding urban infrastructure and consumer goods manufacturing have further increased the use of polymers, coatings, adhesives, and specialty intermediates. Agrochemical demand is also supported by improved crop protection practices and advancements in agricultural inputs.

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- **Skilled Workforce and Engineering Capability:**

  India benefits from a technically trained and cost efficient workforce supported by established engineering institutions and research centres. Strong capabilities in process design, plant commissioning, scale up operations, and product customization enhance industrial competitiveness. This advantage allows domestic firms to undertake complex specialty production and contract manufacturing assignments for global clients.

- **Foreign Investment and Corporate Expansion:**

  The presence of multinational corporations such as BASF, Dow Chemicals, and Bayer reflects continued foreign investor interest. The sector permits 100 percent foreign direct investment under the automatic route in most segments, strengthening capital inflows and technology transfer. Recent large scale investments highlight expansion momentum. Bharat Petroleum Corporation Limited signed agreements with Oil India Limited, Numaligarh Refinery Limited, and Fertilisers and Chemicals Travancore Limited to develop a proposed Rs. 1,00,000 crore refinery and petrochemical complex in Andhra Pradesh. Capacity additions are also visible at firm level, including expansion by Shivtek Spechemi Industries near Hazira, Gujarat. Cross border acquisitions have strengthened global presence. Sudarshan Chemical Industries completed acquisition of Heubach Group, while the Aditya Birla Group acquired a specialty chemicals facility from Cargill in the United States.

- **Self-Reliance in Fertilizers and Public Policy Support:**

  Domestic fertilizer output reached record levels, with urea production exceeding 314 lakh metric tonnes in 2023-24. Total fertilizer production of around 503 lakh metric tonnes against consumption of about 601 lakh metric tonnes has reduced import dependence. Government initiatives further reinforce sector growth. The Union Budget 2025 introduced a second Asset Monetization Plan targeting Rs. 10 lakh crore between FY25 and FY30, covering enterprises such as Gujarat Narmada Valley Fertilizers & Chemicals, Gujarat State Fertilizers and Chemicals, and Rashtriya Chemicals & Fertilizers. Additional measures include cluster based manufacturing promotion, proposed production linked incentives for agrochemicals, and continued research and

Conclusion:

The Indian chemical industry demonstrates structural depth, production resilience, and increasing global engagement. Diversified product coverage, strong specialty segments, and expanding petrochemical capacity have strengthened its industrial foundation. Investment regions and cluster based development have improved infrastructure efficiency and manufacturing concentration. Rising demand from key end use industries continues to support output growth, while skilled technical manpower and research institutions contribute to process improvement and product innovation. The participation of multinational corporations and outward expansion by Indian firms through acquisitions reflect growing international confidence in the sector. Policy measures encouraging domestic manufacturing, foreign investment, and modernization have reinforced long term prospects. At the same time, issues such as environmental compliance, feedstock security, and global competition require careful management. Sustained technological advancement, capacity optimization, and responsible production practices will determine the industry's ability to achieve projected expansion and maintain competitiveness in international markets.

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