

Contribution in the expansion of trade and Commerce- The robust development of a country's trade mostly depends on the quality products and for that the "Make in India" initiative (2014) of the govt. Is designed to facilitate investment, foster innovation, enhance skill development, protect intellectual property and build the best manufacturing infrastructure in the country.

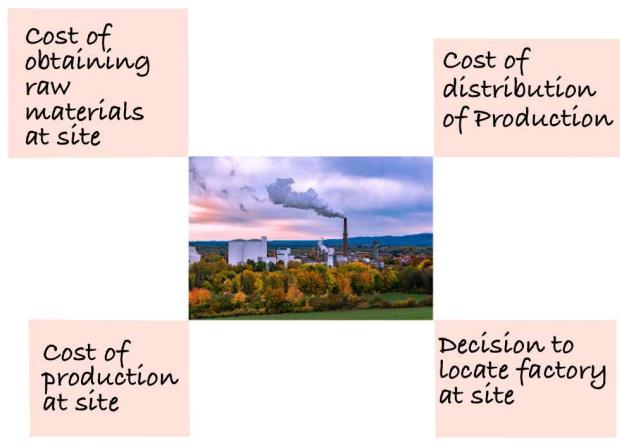
Encourage growth in labour-intensive industries- As we know Wood, paper products and textile industries tend to be more labour-intensive and require a large workforce, mostly unskilled with no special qualifications. By focusing on growth in these industries, it is possible to absorb the rising surplus of unskilled workers, particularly in less developed states (such as UttarPradesh, Bihar, Jharkhand, Odisha etc.)

Factors affecting the Location of Industries

Availability of raw materials- The availability of raw materials, of suitable quality and quantity and in feasible regions, is a basic factor in fulfilling the production requirement for any industry. The size of raw-material deposits is an important consideration in the choice of the scale of production and Industrial location.

Power resources and water- Availability of electric power supply and water over wider areas favours the increasing mobility of labourers, and reduces the influence of geographical factors on the location of industries.

Favourable climate- There can be no industrial development in extremely hot, humid, dry or cold climatic regions. Climate plays an important role in the establishment of industries at a place. Harsh climate is not very suitable for the establishment of industries.

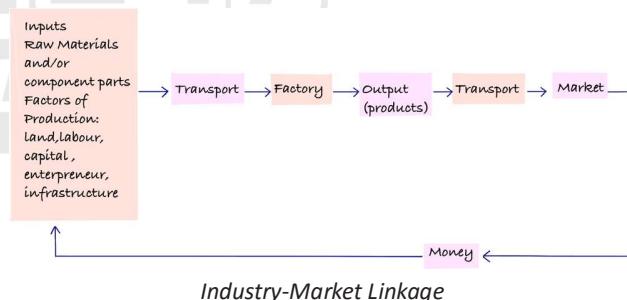


Labour- cheap and Skilled labour is essential for any Industrial location. Availability of labours on a frequent basis encompasses the growth and rapid production, while the unavailability causes slow down of major tasks.

Market- Availability of Market is one of the important factors for location of industries. If the goods produced can not be sold in the market, it will result into the loss for the industry. Markets must also be situated near the industry, as long distance to a market place will result in higher transportational charges.

Transport facilities: Transport facilities, generally, influence the location of industry. Transportation with its three modes, i.e., water, road, and rail collectively play an important role. So the junction points of waterways, roadways, and railways become humming centers of industrial activity. Further, the modes and rates of transport and transport policy of the Government considerably affect the location of industrial units.

Finance: Finance is required for the setting up of industry, for its running, and also at the time of its expansion. The availability of capital at cheap rates of interest and inadequate amounts is a dominating factor influencing industrial location.



Classification of Industries

Industries can be classified into several groups depending on their needs and requirements-

On the basis of Raw- Material and Finished Goods:

- Heavy Industries-** Industries which use heavy and bulky raw- materials and produce products of the same category are called heavy industries. Example- Iron and steel Industry.
- Light Industries.** The light industries use light raw-materials and produce light finished products. They usually employ female labour. Example- Textile industry, electronics fans, sewing machines are light industries.

Footloose industry:

- The footloose industry is one, which does not have a strong locational preference as the input resources and output markets can be found in many places.
- As these industries are prone to location, hence they are called footloose.
- These industries require small plant size compared to heavy and small industries.
- Some prominent examples of the footloose industry are diamond cutting, precision electronics, watch-making, Computer chips & Mobile manufacturing etc.
- Most of the footloose industries produce low volume and high-value outputs.
- They are generally non-polluting industries.

Sunrise industry:

- This type of Industry shows potential for substantial and rapid growth.
- Major characteristics of sunrise industries are high-growth rates and a lot of start-ups and venture capital funding.
- A sunrise industry is one that is new or relatively new, it grows fast.
- Examples of sunrise industries include food processing industry, petrochemical industry, hydrogen fuel production, Space tourism, and online encyclopaedias.

Weighloose Industries:

- These are those industries, in which raw material is bulky, but the finished goods are very light.
- Weight Loose industries are located near raw materials. For eg. Sugar industries are located near Sugarcane areas.
- Pulp industry, copper smelting and pig iron industries are examples of weight loose industries.

On the basis of strength of Labour:

1. **Large-scale Industries-** Industries which employ a large number of labour in each unit, are called large – scale Industries. Example- Cotton or jute textile industries.
2. **Medium – scale Industries-** The industries, which employ neither a very large number of labour nor a small number and have investment of about one

million rupees, are put in this category. Examples- radio and television industries.

3. **Small – scale Industries-** Industries, which are owned and run by individuals and which employ a small number of labour, are called small – scale industries. Example- Powerloom industry.

On the basis of Ownership:

1. **Private Sector Industries-** Industries owned by individuals or firms. Example- Bajaj Auto or TISCO situated at Jamshedpur.
2. **Public sector Industries-** Industries owned by the state and its agencies. like Bharat Heavy Electricals Ltd, or Bhilai Steel Plant are public sector industries.
3. **Joint Sector Industries-** Industries owned jointly by the private firms and the state or their agencies such as Oil India Ltd. etc. are known as Joint Sector Industries.
4. **Cooperatives Sector Industries-** Industries owned and run cooperatively by a group of people who are generally producers of raw materials of the given industry are called co-operative sector industries. Example- Sugar mills, Flour mills etc.

On the basis of source of Raw Material:

1. **Agro- based Industries-** Those industries which obtain their raw-materials from agriculture like Cotton textile, jute textile, silk, sugar, vegetable oil and paper industry etc are known as agro-based industries.
2. **Mineral- based Industries-** The Industries that receive raw materials primarily from minerals such as iron, copper, zinc, aluminium etc are called Mineral based industries.
3. **Forest based industries-** These industries draw their raw materials from the forests. Paper, cardboard, lac, rayon, resin, tanning of leather, hide, basket industries etc. are prominent examples.

Agro based Industries

Cotton Industry

The use of cotton for fabric is known to man-kind as old as the **Indus Valley Civilisation**. Cotton is fluffy, soft that grows in a protective case called a **boll**. The cotton fiber is spun into yarn or thread to make it into a durable textile. The shrub is native to the tropical and sub-tropical regions of the world. Regions known for cotton growing are the USA, Mexico, Egypt, Australia, and India. Cotton

accounts for a major portion of the total fabric produced. India's cotton textile is in great demand across the world. India monopolized the production of textile goods from 1500 BC to 1500 AD. Cotton textiles were in great demand across the world. Post partition the cotton industry was badly affected. Most of the weavers migrated to Pakistan. The cotton industry shifted from high labor cost areas of Mumbai to low labor cost areas in Madurai, Tirunelveli, and Coimbatore.

DO YOU KNOW?

The first modern cotton textile mill was set up in Mumbai in 1854 by the Parsi entrepreneurs.

Locational Factors:

The following are the favourable location factors of the cotton industry:

- Availability of Raw Cotton
- Market
- Transport facilities
- Accessibility of Port
- Labour
- Moist Climate
- Skilled and semi-skilled labor

Initially, cotton industries were developed in Maharashtra and Gujarat due to the availability of a moist humid climate. But nowadays, the moist climate can be generated in an artificial way. The cotton industry is not weighted losing raw material hence cotton industries are seen in the other part of India also. At present, the High concentration of the cotton textile industry belt is seen in Maharashtra, Gujarat, and Tamil Nadu because of the above favorable factors.

Distribution:

The major cotton-growing regions in India are the Western Region, Southern Region, Northern Region, and Eastern Region. Gujarat followed by Maharashtra is the largest cotton-growing state in India. Ahmedabad is regarded as the Manchester of India & Boston of the East. Other important

cotton-growing regions are Coimbatore of Tamil Nadu, which is regarded as "Manchester of South India", and Kanpur is regarded as "Manchester of Uttar Pradesh".

Distribution of Cotton Industry in India:

Some other major cotton-producing regions in India are:

- **Maharashtra**- Jalgaon, Kolhapur, Pune, Sangli, Sholapur, and Nagpur.

Maharashtra is the leading producer of cotton textiles in India. Mumbai is regarded as the "**Cottonopolis of India**".

- **Gujarat**: Ahmedabad, Vadodara, Bharuch, Surat, Rajkot, Porbandar, Bhavnagar, and Nadiad.

Gujarat second largest producer of cotton yarn and also owns the second-largest number of mills in India.

- **Tamil Nadu**: Coimbatore, Tirupur, Madurai, Salem, Pollachi, Chennai, Tuticorin, and Tirunelveli.

Tamil Nadu owns the largest number of mills in India.

- **Andhra Pradesh**: Guntur, Vijayawada, Warangal, Anantapur, and Venkatagiri.

- **Karnataka**: Belgaum, Bengaluru, Mysore, Bellary, Hassan, and Mangalore.



- **Uttar Pradesh:** Kanpur, Moradabad, Etawah, Agra, Meerut, and Hathras.
- **Madhya Pradesh:** Gwalior, Jabalpur, Indore, Ujjain, Bhopal, and Dewas.
- **Rajasthan:** Udaipur, Bhilawada, Kota, Bhavanimandi, and Jaipur.
- **West Bengal:** Howrah, Kolkata, Murshidabad, Serampore, Saikia, and Shyamnagar.

Challenges faced by the cotton industry:

1. **Scarcity of Raw Cotton:** Indian cotton textile industry suffered a lot as a result of partition because most of the long staple cotton growing areas went to Pakistan. Although much headway has been made to improve the production of raw cotton, its supply has always fallen short of the demand. Consequently, much of the long staple cotton requirements are met by resorting to imports.
2. **Obsolete Machinery:** Most of the textile mills are old with obsolete machinery. This results in low productivity and inferior quality. In the developed countries, the textile machinery installed even 10-15 years ago has become outdated and obsolete, whereas in India about 60-75 per cent machinery is 25-30 years old.
3. **Erratic Power Supply:** Power supply to most cotton textile mills is erratic and inadequate which adversely affects the production.
4. **Low Productivity of Labour:** Labour productivity in India is extremely low as compared to some of the advanced countries. On an average a worker in India handles about 2 looms as compared to 30 looms in Japan and 60 looms in the USA. If the productivity of an American worker is taken as 100, the corresponding figure is 51 for U.K. 33 for Japan and only 13 for India.
5. **Strikes:** Labour strikes are common in the industrial sector but cotton textile industry suffers a lot due to frequent strikes by a labour force. The long drawn strike in 1980 dealt a severe blow to the organised sector. It took almost 23 years for the Government to realise this and introduce legislation for encouraging the organised sector.
6. **Stiff Competition:** Indian cotton mill industry has to face stiff competition from powerloom and handloom sector, synthetic fibres and from products of other countries.
7. **Sick Mills:** The above factors acting singly or in association with one another have resulted in many

sick mills. As many as 177 mills have been declared as sick mills. The National Textile Corporation set up in 1975 has been striving to avoid sick mills and has taken over the administration of 125 sick mills.

Significance of Cotton Industry in India:

India is one of the leading producers and exporters of cotton textiles in the world. The industry provides employment to a significant population of the country. Around 20 percent of the industrial labor of India is engaged in this industry. The cotton textile industry remains the largest organized modern industry in the country.

Government Initiatives:

- **Fibre revolution:** The government has launched the **Silver Fibre Revolution** to boost the production of cotton in the country.
- **Clusters:** Mega-Textile Clusters are set up in the cotton-growing cities of Lucknow, Surat, Kutch, Bhagalpur, and Mysore.
- **National Textile Policy:** Ajay Shankar Committee was set up to review the National Textile Policy in India.
- **Technology Mission on Cotton:** It was launched to enhance the research and development in the cotton industry.
- **Ajay Shankar Committee:** A committee was set up to review the **National Textile Policy** in India.
- **Technology Mission on Cotton:** The Technology Mission on Cotton was launched to enhance the research and development in the cotton industry. **BT cotton** has been introduced to address the problems of pests and low yields.
- **FDI:** The government has allowed 100% FDI in the sector under the automatic route.
- **A National Technical Textiles Mission:** The mission is proposed for a period from 2020-21 to 2023-24.
- **Amended Technology Up-gradation Fund Scheme (A-TUFS):** This scheme aims to create employment for 35 lakh people and enable investment worth Rs. 95,000 crores by 2022.
- **Integrated Wool Development Programme (IWDP):** It provides support to the wool sector, starting from wool rearer to end consumer, with an aim to enhance quality and increase production during 2017-18 and 2019-20.
- **'Scheme for Capacity Building in the Textile Sector':** The Cabinet Committee on Economic Affairs (CCEA), approved a new skill development scheme named 'Scheme for Capacity Building in the Textile Sector'.

BT Cotton:

BT Cotton is a genetically modified crop (GM crop) that has been created by inserting two genes from a soil bacterium *Bacillus Thuringiensis*. This genetically modified cotton plant releases a protein that is toxic to the bollworm or pinkworm (pest) and makes cotton plant resistant to their attack. The BT cotton was first developed by Bayer-Monsanto of US. It is the only GM crop that is allowed to be cultivated in the country.

Jute Industry

Jute industry is one of the oldest industries in India. Jute is a soft, long, and shiny fiber that is used to produce long threads. Jute is a natural fiber that is affordable and cheap next to cotton fiber. Jute is also called golden fiber for its color. Post-independence the industry made rapid growth as an export-based industry.

Jute products include carpets, canvas, pack sheets, gunny bags, hessians and etc. Apart from contributing to the national exchequer it also provides employment to a sizeable population in both agricultural and industrial sectors. India is one of the top producers and exporters of raw jute and jute-related goods respectively.

Locational Factors:

Jute plants require plain alluvial soil and standing water. It requires a warm and wet climate to grow and that is provided by the monsoon season prevailing in the Indian subcontinent. The temperatures vary from 20 to 40 degrees Celsius with a relative humidity of 70 to 80 percent.

Do You Know?

The first modern jute mill was established at Rishra near **Kolkata** in 1855. The jute mill was power-loomed in 1859 that included both spinning and weaving.



Jute Textile Industries in India

Distribution:

Post-independence, the Jute industry dispersed to four major regions of **North-East India**, **North-East plains of Bihar**, **Terai regions of Uttar Pradesh**, and **the Eastern Coastal region**.

1. **West Bengal**: Mills near Hugli River Basin.
2. **Andhra Pradesh**: Guntur, Visakhapatnam, Ongole, and Eburu
3. **Bihar**: Darbhanga, Samastipur, and Gaya
4. **Chattisgarh**: Raigarh
5. **Odisha**: Cuttack

Factors that lead West Bengal to become the leading producer of Jute:

The locational factors that enabled West Bengal as the leading producer of Jute are:

- An abundant quantity of flowing water is received from the Hugli River that is used for washing, dyeing, and retting.
- The waterway provided by the Hugli River provides a cheap transportation facility.
- Most of the jute production (around 90 percent) comes from the **Ganga-Brahmaputra delta**.
- Jute industry is a labor-intensive industry. The cheap labor is available from West Bengal, Bihar, Uttar Pradesh, and Odisha.
- Ready availability of coal is facilitated by the **Raniganj Coal Fields**.
- Port facilities of Kolkata help the regions with the import of machinery and export of finished goods.
- The hinterland of Kolkata and the hinterland provide a ready market for the Jute industry. The development of other industries like the sugar industry in nearby regions of Bihar and Uttar Pradesh increases the demand for gunny bags and resulting Jute industry.
- The Jute industry has dispersed to some regions across the country with the rise of the cement industry. For example, Madhya Pradesh.

Challenges:

- **Partition**: After the partition of India, around 80 percent of the jute growing areas went to East Pakistan (Now Bangladesh), while the mills remained in India. The political reasons were not conducive

to the import of raw materials from Bangladesh. However, this was later resolved by the growing large scale of Jute and Mesta in India.

- **Fall in demand**: There is a reduction in overall demand for Jute in the international market due to the tough competition from synthetic packing materials.
- **Competition**: The tough competition is provided by developed countries like **China, Argentina, Europe and USA, Canada, and Japan**.
- **Alternative to Jute**: The demand for local fibers like **Mesta** (in Andhra Pradesh) has reduced the demand for Jute.
- **Obsolete Technology**: Prevalent use of obsolete technology without any machinery development and automation has reduced the competitiveness of the mills.

Importance:

Jute industry holds a bright prospect of becoming an alternative to polythene and plastic bags. With advanced research, Jute is used for apparel manufacturing. Jute is also used directly or indirectly in the plastic furniture, insulation, bleached fibers used to blend with the wool, and mixed with cotton to make carpets and blankets.

Government initiatives:

- The government has launched the **golden fiber revolution** to boost the production of jute.
- Apart from that, the government has issued specific orders to use Jute packaging for cement, sugar, and fertilizer industries.
- The government has formed the national Jute Manufactures Corporation to boost the Jute industry.
- The I-CARE programme unveiled by the National Jute Board and the Jute Corporation of India seeks to address the retting issue by introducing a pilot project on retting technologies aimed at increasing farmers' returns.
- A recent initiative called 'The Jute Foundation' (TJF) is trying to address many issues pertaining to the environment-friendly product.

Silk Industry

Silk industry in India is one of the largest generators of employment and foreign exchange for the country as sericulture activities spread across 52,360 villages. India enjoys a unique global position in terms of production of all commercially useful varieties of silk. India is the second largest producer of silk. Sericulture provided employment to over 9.1 million people in India during FY19.

The silk products exported include natural silk yarns, fabrics, made-ups, readymade garments, silk carpets and silk waste.

India is the second largest producer of natural silk after China and is the only country producing all four varieties of natural silk: Mulberry, Tasar, Oak Tasar, Eri and Muga. This industry got great patronage during the medieval period. The famous 'Silk Route' passed through India, and Indian silk found markets worldwide.

Locational factors:

- Silkworm is one of the most important domesticated insects, which produces luxuriant silk thread in the form of cocoon by consuming mulberry leaves during larval period.
- The growth and development of silkworms is greatly influenced by environmental conditions.
- The biological as well as cocoon-related characters are influenced by ambient temperature, rearing seasons, quality mulberry leaf, and genetic constitution of silkworm strains.

Distribution:

1. Karnataka

It is the **largest producer** of silk in India. It produces an average of around 8,200 metric tonnes of silk every year, which is about one-third of the total silk production in India.

Doddaballapur, Tumkur, Bangalore and Mysore

2. West Bengal

Silk Industry is an important agro-based cottage industry in this state. It produces 9% of total production of silk in the country and all the 4 commercially produced varieties of silk - mulberry, tussar, eri and muga, are cultivated here.

Murshidabad, Malda, Bankura

3. Tamil Nadu

This state is well known for its traditional silk sarees and dhoties woven on handlooms. It is also the leading state in the production of bivoltine silk (white silk) for which there is very high demand in overseas markets.

Coimbatore, Tirunelveli, Dharmapuram, Salem

4. Bihar

The silk handloom weavers of Bihar are facing stiff competition from power loom and mill sector due to high input cost, low productivity and availability of cheaper imported silk fabric etc. sluggish export market and capture of export market by other major silk producing countries like china.

Katihar and Bhagalpur

5. Andhra Pradesh

It is one of the largest producers of mulberry silk in India and its strength lies in the large silk traditional weaving clusters like Dharmavaram, Hindupur and Pochampally. Hindupur is the silk city of Andhra Pradesh.

The state government provides a subsidy of up to 50 per cent to farmers for the construction of sheds, purchase of equipment, and for the setup of reeling units. The farmers breed bivoltine and multi-voltaine races of silk worms, depending on climatic conditions.

Karimnagar, Warangal, Mahbubnagar, Kurnool, Ongole, Adilabad, Dharmavaram, Hindupur and Pochampally.



Challenges: Imports of raw silk from China have risen in recent years, and the Indian textile market also faces competition from cheaper textiles from neighboring countries. In terms of the silk production process, the industry uses a lot of outdated technology and low-quality seeds. This can result in low-quality finished products. The country is also encountering a shortage of agricultural laborers, and together with high production costs and low productivity, this makes it difficult to keep production numbers up.

Government Initiative:

- The Government of India through the Central Silk Board has been implementing a Central Sector Scheme "Silk Samagra" an Integrated Scheme for Development of Silk Industry (ISDSI) during the year (2017-20).
- The aims & objective of the scheme is to scale up production by improving the quality and productivity and to empower downtrodden, poor & backward families through various activities of sericulture in the country.
- The scheme comprises four (4) major Components viz.
 - ◆ Research & Development, Training, Transfer of Technology and I.T. Initiatives,
 - ◆ Seed Organizations,
 - ◆ Coordination and Market Development and
 - ◆ Quality Certification Systems (QCS)/Export Brand Promotion and Technology Up-gradation.
- Automatic Reeling Machines (ARM)/Units have been established in the country to produce international standard silk of 3A-4A grade.
- Mobilization of additional funds for sericulture development through convergence by availing the schemes such as Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) and Rashtriya Krishi Vikas Yojana (RKVY)

Woolen Industry

The modern woollen textile industry started with the establishment of 'Lai Imli' at Kanpur in 1876.

It was followed by setting up of woollen textile mills at Dhariwal (Punjab) in 1881, Mumbai in 1882 and Bangalore in 1886. The industry could not make much headway till the Second World War. Rapid progress has been observed during the planning era. At present there are 621 big and small mills, 1,100 hosiery units and 155 yarns spinning units.

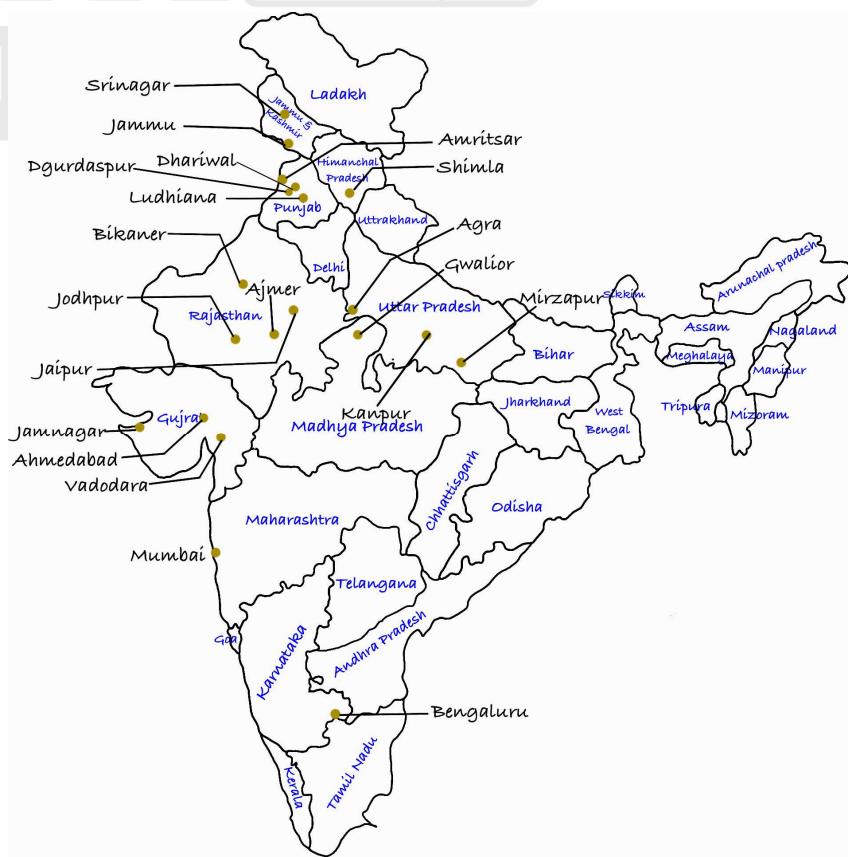
The Wool and Woolen Textiles Industry is a rural-based, export-oriented industry in which the organized, decentralized, and rural sectors work in conjunction.

India is the world's seventh-largest producer of wool, accounting for 1.8 percent of global production.

Locational factors:

The geographical factors which determine the location of woollen industries are

- **Climate:** The wool industry requires a favorable climate, such as a dry climate. Since the damp, cold conditions in the Northern Hemisphere are unsuitable



for wool production, the Southern Hemisphere takes the lead.

- **Supply:** Wool supply in the area is the prerequisite for this industry.
- **Water:** Washing and dyeing processes use water from nearby streams.
- **Power:** Machines can be powered by coal.
- **Market:** A market or center to sell processed wool is necessary.
- **Labour:** As this industry is a labor-intensive industry, it should take effective manpower into account.
- **Capital:** A good banking-finance facility and other institutions aiding in capital creation is necessary.

Distribution:

- **Rajasthan:** Jodhpur, Beawar, Bikaner, Ajmer, Jaipur
- **Punjab:** Amritsar, Ludhiana, Patiala Dhariwal
- **Uttar Pradesh:** Modinagar, Kanpur, Allahabad, Varanasi, Mirzapur
- **Gujarat:** Jamnagar, Vadodra
- **Maharashtra:** Jalgaon, Amravati, Ambernath, Mumbai
- Rajasthan, on the other hand, is the state that produces the most wool.

Challenges:

1. **Shortage of raw wool:** India does not produce sufficient quantities of fine quality raw wool. As productivity of Indian sheep is very low. On an average, an Indian sheep yields only 0.86 kg of wool per annum against 4.08 kg yielded by an Australian sheep. Large proportion of wool produced in India is of inferior quality and does not conform to international standards. India had to import 19.0 thousand tonnes of raw wool worth Rs.15 crore in 1970-71. The corresponding figures were 252.9 thousand tonnes and Rs. 1,570 crore in 2003-04.
2. **Lack of Market:** Most parts of India have tropical and subtropical climate which restricts the demand for woolen clothes. The southern part of the country enjoys warm weather throughout the year and people do not require woolen clothes at all. Even in the northern parts of India, the winter season lasts only for four to five months in a year and it is only during this period that woolen clothes are required to some extent. The hot weather lasting for 7 to 8 months is the slack period during which production is carried out mainly for the Armed Forces and for export. For practical purposes, the woolen textile

industry is a seasonal phenomenon in India.

3. **Lack of Modern Equipment:** Most of the equipment in the woolen textile industry, like other textile industries, is obsolete and outdated as a result of which, its products are not able to cope with the ever-changing designs and patterns, especially in the international market. There is an urgent need for mechanisation of the carpet industry keeping in view the rising demand to put a ban of the child labour. This will also help to increase the production and improve the quality.
4. **Low Quality:** Leaving aside a few exceptions, Indian woolen goods are considered to be of low quality in the international markets which results in lack of demand. Indian knitwear is often not shrink resistant, moth-proof and fast-coloured.

Government Initiatives:

- Integrated Wool Development Programme (IWDP) is an umbrella programme, implemented in all wool-producing states to support small, medium and large scale wool-producing units.
- The scheme was also implemented to boost the economic status of the wool-producing manufacturers in the rural regions of the country.
- The primary goal of the scheme is to stop the decline of the wool production in India and uplift the manufacturing process by offering various components in this scheme and to enable a steady growth in the production of wool among all rural wool-producing sectors.

Objective of the Scheme:

- To increase the annual wool production in India
- To improve the quality of wool fiber and quality of processing the wool
- To establish service and research centers to improve the quantity and quality of import and export production
- To increase marketing and branding promotion for export production of wool

Sugar Industry

Sugar production in India was practiced since ancient times. Sugar-making process is mentioned in the **Atharva Veda** and is known as **Sankaran**. However, the modern sugar industry in India was developed in the first decade of the twentieth century. The sugar industry is the **second** largest agro-based industry in India after

the textile industry. Sugarcane offers a large diversity of by-products ranging from sugar, jaggery, sucrose, syrups, fibers, bagasse (used as fuel), molasses (used to extract sugar), and alcohol. However, the main by-products of the sugarcane industry are **bagasse**, **molasses**, and **press mud**.

DO YOU KNOW?

After Brazil, India is the **second-largest producer** of sugar in the world. India is also the largest consumer of sugar in the world.

Locational factors:

Factors affecting the location of the sugar industry are as follows.

- **Raw material:** Sugar cane are highly perishable, hence, manufacturing of sugar has to be done sooner once it is harvested. This makes the sugar industry to locate near the source of raw material. Sugar industry is a weight losing industry, therefore the industry tends to locate near the sugar cane farms.
- **Climate:** In cold climate the sucrose content in sugarcane do not dry easily, therefore, they require longer crushing periods. However, warmer climate ensure increased sucrose content in sugarcane resulting in higher yield. Therefore, a warmer climate is suitable for sugarcane and this proves why there is increased sugarcane production in southern and western India.
- **Soil:** Black soil with high water retention capacity is good for sugar cane growth. Hence, sugar industries are more concentrated in western India which has black lava soil.
- **Energy:** Bagasse is used as fuel in sugar industries to power sugar mills.

Distribution:

Sugarcane is grown both in the north and peninsular India. Sugarcane production is dominant in two major belts of India- The North India belt and the peninsular belt of India. The

north India belt comprises Uttar Pradesh, Haryana, Bihar, and Punjab while, the southern India belt comprises Maharashtra, Karnataka, Tamil Nadu, and Andhra Pradesh. While Uttar Pradesh is the largest sugarcane-producing state in India, Uttar Pradesh, Maharashtra, and Tamil Nadu account for seventy percent of the total production of sugar in the country.

- **Uttar Pradesh:** Saharanpur, Bijnor, Meerut, Muzaffarnagar, and Moradabad, Basti, Gorakhpur, Deoria, and Gonda.
- **Bihar:** Saran, Darbhanga, Muzaffarpur, and Champaran.
- **Maharashtra:** Pune, Satara, Sholapur, and Kolhapur.
- **Punjab:** Dhuri and Phagwara.
- **Karnataka:** Shimoga, Mandya, and Munirabad.
- **Tamil Nadu:** Coimbatore, Pugulur, Nalicipuram, and Pandyrajapur.
- **Andhra Pradesh:** West Godavari to East Godavari, Visakhapatnam, and Chittoor.
- **Telangana:** Medak and Nizamabad.



- **Odisha:** Rayagada and Bargarh
- **Madhya Pradesh:** Sihor

The reasons for the concentration of sugar industries in Uttar Pradesh and Bihar:

- Availability of fertile alluvial soil that is rich in potash and lime which helps the growth of sugarcane.
- The leveled topography of the land is suitable for irrigation.
- Availability of abundant water for processing and washing.
- Availability of cheap labor.
- Better transportation facilities coupled with the presence of densely populated markets in the surrounding regions.

Challenges:

Raw material constraint:

- The raw material for sugar is weight losing. It cannot be stored for long periods and cannot be transported for very long distances as it loses the sucrose content.
- There is a lack of good quality sugarcane in India. The sucrose content in Indian sugarcane is low.

High production cost:

- Production of sugarcane in unit areas is low as compared to major sugar cane-producing countries of the world.
- The cost of production of sugar is very high because of the short crushing season, low rate of sugar recovery, and defaulted supply of sugarcane owing to the competition with other cash crops.
- The cost of production is high in Maharashtra because of the high cost of irrigation and manure applied.

Short crushing season:

- Sugar manufacturing is a seasonal phenomenon with a short crushing season that varies from four to 7 months in a year. Mills and workers remain unemployed for the remaining period of the year which creates financial distress for the industry and makes it a loss-making industry.

Competition from other cash crops:

- Sugarcane in south India has higher sucrose content than the sugarcane grown in the north. The crushing

season is longer in the south than in the north. Despite having better transportation facilities, good irrigation facilities, tropical climate, other cash crops in peninsula India like tobacco, coconut, and groundnut overshadow the production of sugarcane.

- The obsolete technology and high excise duties increase the cost of production.

Faulty policies:

- There is a mismatch between sugarcane and sugar prices. The fair and remunerative price fixed for sugarcane by the GoI results in the over-production of sugarcane and sugar. This results in falling sugar prices below the production cost levels.

Fair and Remunerative Price (FRP) is the minimum price that is paid by the sugar mills to the farmers for the sugarcane. This minimum price or FRP is determined by the Commission for Agricultural Costs and Prices (CACP) after consulting the stakeholders and the state governments.

Significance:

The importance of the sugar industry in a developing country like India is:

- The sugar industry is a significant contributor to the rural economy as most of the sugar mills are located in rural areas.
- Sugar is a labor-intensive industry that is one of the largest providers of employment to the rural population.
- The byproducts from sugarcane are used as raw materials in a number of other allied industries:
 - ◆ The **molasses** are used as organic fertilizer and animal feed. Molasses are also used to prepare alcohol by the process of fermentation and distillation.
 - ◆ The **press mud** is a residual waste that is used as fertilizers, tooth powder, board chalk, and other miscellaneous uses.
 - ◆ The **bagasse** (the cellulosic residue of sugarcane) is used for the production of ethanol and biogas.
- Ethanol produced from sugarcane has a great potential to become an alternative to fossil fuels such as coal, oil, and natural gas.

Ethanol Roadmap of India:

- Ethanol is one of the biofuels derived from sugarcane that is aimed to be blended with petrol thus cutting fuel imports and reducing carbon emissions.
- Ethanol blending refers to the mixing of ethanol with petrol or gasoline and diesel which facilitates complete combustion of the resultant fuel and cutting on harmful emissions to the environment.
- Thus ethanol blending provides a green and clean fuel along with a reduction of high fuel imports.

Government Initiatives:

- **The Rangarajan Committee:** To check the mismatch between sugarcane and sugar production, the Rangarajan Committee was formed in 2012 that suggested measures to resolve the issue.
- **De-regulation of sugar prices:** Based on the committee's suggestions, both sugarcane and sugar prices were exempted from government control and de-regulated, thus, allowing the market to determine the prices by the forces of demand and supply.
- **Hybrid approach:** Based on the report, the Commission for Agricultural Costs and Prices (CACP) suggested a hybrid approach to fix the sugarcane prices that involved fair and remunerative prices.
- **Relaxation of restrictions:** The relaxation of restrictions on the sale of byproducts was recommended and the prices of the byproducts should be market-determined.
- **Dismissing minimum distance norm:** The committee recommended reviewing the norm of the minimum prescribed distance of 15 kilometers between two sugar mills. This norm resulted in a virtual monopoly by the mill owners in large areas over the farmers.
- **Ethanol Blending Programme:** Currently, the Government of India is encouraging **Ethanol Blending Programme (EBP)** by including it in the policymaking through **National Policy on Biofuel 2018**. Currently, the Government of India targets 8.5 percent of ethanol blending with petrol. The advanced target of blending ethanol in petrol has been pegged at 20 percent by 2023.

Tea Industry

India is the largest consumer of tea in the world. Almost 3/4th of the total tea production of the country

is consumed locally. Tea is grown in 16 states in India. Assam, West Bengal, Tamil Nadu, and Kerala account for about 95 per cent of total tea production.

Locational factors for cultivation of tea:

- Rainfall: 1500mm
- Temperature: it has to be less than 15 degrees C
- Tropical and subtropical climate is required. The soil needs to be rich in Humus and organic matter. It has to be well drained and deep and fertile.
- The tea crop requires a warm and moist free climate throughout the year.

Distribution:

India is the largest producer and consumer of black tea in the world. Tea is grown in 16 states in India. Assam, West Bengal, Tamil Nadu, and Kerala account for about 95 per cent of total tea production.

India's major Tea Producing Districts/Areas are as follows:

- **Assam:** Darrang, Goalpara, Kamrup, Lakhimpur, Dibrugarh, Nowrang, Sibsagar, Cachar, Karbi Anglong, North Cachar
- **West Bengal:** Darjeeling, Terai (west Dinajpur), Darjeeling, Cooch Bihar.
- **Tamil Nadu:** Kanyakumari, Tirunelveli, Madurai, Coimbatore, Nilgiris
- **Kerala:** Cannanore, Palghat, Kozhikode, Malappuram, Trichur, Thrissur, Quilon, Kottayam, Ernakulam, Idukki, Wynad
- **Karnataka:** Chikmagalur, Coorg, Hassan

The Largest state with area under Tea Plantations in India is Assam.

Challenges:

- **Tea prices started declining:** Across the world, tea's auction price has declined in the recent past as per the World Bank's report. And also no proper steps were taken to improve the quality of tea being produced in India to raise the price margins
- **Less Production:** Tea industry is facing a number of problems such as financial problems, power problems, labor issues, poor labor schemes, inadequate communication system, increased pollution fee, less subsidy for transport etc. This kind of situation have put the tea industry in North East India in a hopeless situation, resulting in low production of tea and tea leaves.

- Climatic Conditions:** If climatic conditions are unfavorable for tea plantations owing to less or heavy rainfall that also poses severe problems affecting the production of tea and lives of tea industry laborers.
- Pest Problem:** Bacterial black spot is a disease that spreads and spoils the tea leaves. North East Tea Estates are prone to this kind of a disease spread by a bug and this is also an issue that affects tea industry
- Low wages for laborers:** As price realization of tea is very less in the international market and as temporary laborers are used in the peak seasons, usually the wages paid for tea industry laborers are very less. This made some of them starve and leave the industry.
- Quality deterioration:** As importance is given only to production increase and not for quality improvement, Indian tea known for its superior taste may lose its market in the international arena if quality is not taken care of.

Government Initiatives to promote Tea Industry:

- The Assam government has launched Assam Tea Industries Special Incentive Scheme.
- ATISIS is aimed at boosting the production of orthodox or specialty tea in the state by extending incentives to the tea gardens.
- This Scheme is applicable for a period of three years.
- Under the scheme, the government will provide interest subvention of 3% on the working capital loan per annum subject to a maximum of Rs. 20 lakhs.

Coffee Industry

Coffee is the second most consumed beverage crop in India after Tea. India is the third-largest producer as well as exporter of coffee in Asia. It is the sixth-largest producer and fifth-largest exporter of coffee in the world. Indian coffee is known to be the finest coffee grown in the world. Almost 80% of Indian coffee is exported. Two of the famous species of coffee grown in India are the Arabica and Robusta.

Locational Factors for coffee cultivation:

- Coffee plantation requires hot and humid climatic temperatures.
- The temperature for coffee plantation varies between 15 degrees C to 25 Degrees C
- Rainfall for the plantation varies between 150cm to 250cm.
- Snowfall, Frost, High temperatures are harmful for the coffee crop.

- Strong sun rays, and south-west monsoon winds can impact the crops.
- Soil having a good amount of humus and minerals containing iron and calcium are good for coffee cultivation.

Distribution:

India produces about 2.5% of the world's coffee on almost the same percentage of coffee plantations. Thus India is an insignificant producer of coffee and stands nowhere when compared with Brazil (25%), Columbia (15%) and Indonesia (7%).

Coffee Arabica and Coffee Robusta are the two main varieties of coffee grown in India accounting for 49% and 51% of area respectively under coffee.

The restricted agro-climatic conditions have forced the coffee plantations to confine themselves to small areas in south India comprising hill areas around Nilgiris. Almost the entire production is shared by three states namely Karnataka, Kerala and Tamil Nadu.

- Karnataka:** Kodagu, Chikmagalur, Shimoga, Hassan and Mysore.
- Kerala:** Kozhikode, Wayanad, Malappuram, Kollam, Kannur and Palakkad are the chief producing districts.
- Tamil Nadu:** Nilgiri district, Madurai, Tirunelveli, Salem and Coimbatore.

Karnataka is the largest producer accounting for about 70% per cent of total coffee production and 60% of the area under coffee in India. Kerala is the second largest producer of coffee but lags far behind, accounting only for about 23.27 per cent of the total production of the country. Tamil Nadu is the third largest producer where India's 6 per cent coffee is produced.

Other areas:

Some coffee is also grown in Satara and Ratnagiri districts of Maharashtra. In line with the national policy of tribal development, coffee cultivation is being encouraged in such non-traditional areas as Andhra Pradesh, Orissa, Maharashtra, the north-eastern states and Andaman and Nicobar Islands.

Challenges:

- Extreme weather events:** Coffee-producing South Indian states have been witnessing a series of extreme weather events in the last four years. The frequency of dry spells during the rainy season has increased, resulting in deficit monsoon and droughts. The deficit rainfall and rise in temperatures led to lesser coffee production in the country. Extreme weather events

have not only led to a decrease in coffee production but have also impacted the premier coffee market.

- **Uneven rainfall and temperature:** "Premier quality of coffee is grown in specific regions where the climate allows it to ripen on time. But uneven rainfall and rising temperatures led to deterioration in the quality of the beans."
- **Skilled labour shortage:** Acute shortage of skilled labours in India
- **Higher production cost:** There is higher production cost for coffee in India: from ever-increasing overheads, rising wages, mandatory spends on housing and healthcare for plantation workers
- **Production losses:** In the last decade, crop disease, low international prices and vagaries of the weather led to production losses.

Government Initiatives:

- Owing to the importance of the economic contribution of coffee production in India, the Ministry of Commerce and Industry, Government of India, launched the Coffee Board in 1942. The board was established mainly to assist the coffee growers with trending technologies and increase the quality and production of coffee in India.
- The Integrated Coffee Development Project Scheme (ICDP) is one such scheme launched by the Ministry to encourage coffee development in traditional and non-traditional areas in India.
- The ICDP scheme, which is implemented with the financial allocation of Rs.950 Crores aims at achieving the following objectives:
 - ◆ To cultivate improved varieties of coffee.
 - ◆ To enhance the quality and production of coffee
 - ◆ To educate the coffee growers through research and development and incorporate them with advanced technologies
 - ◆ To extend development support to the coffee growers
 - ◆ To promote native breed coffee in the national and international market
 - ◆ To strengthen the domestic market with developmental activities

Vegetable Oil Industry

The vegetable oil processing industry involves the extraction and processing of oils and fats from vegetable sources. Vegetable oils and fats are principally used

for human consumption but are also used in animal feed, for medicinal purposes, and for certain technical applications. The oils and fats are extracted from a variety of fruits, seeds, and nuts.

Distribution:

The vegetable oil industry is widely scattered and the sizes of the units differ from location to location. Maharashtra has the largest number of Vanaspati Units, followed by Gujarat, Uttar Pradesh, West Bengal, Karnataka, Tamil Nadu, Andhra Pradesh, Madhya Pradesh, Rajasthan and Punjab.

Primary sources of vegetable oil:

- Nine oilseeds are the primary source of vegetable oils in the country, which are largely grown under rainfed condition over an area of about 26 million ha.
- Among these, soybean (34%), groundnut (27%), rapeseed & mustard (27%) contributes to more than 88% of total oilseeds production and >80% of vegetable oil with major share of mustard (35%), soybean (23%) and groundnut (25%).
- India is producing about 7-8 million tones of vegetable oils from primary sources

Secondary sources of vegetable oil: In addition to nine oilseeds, vegetable oil is also being harnessed from secondary sources like cottonseed, rice bran, coconut, Tree Borne Oilseeds (TBOs) and Oil Palm. Oil palm which is categorized as secondary sources of oils should be included as primary source as it gives the highest per ha oil yield.

Do You Know?

Palm oil is currently the world's most consumed vegetable oil.

It is used extensively in the production of detergents, plastics, cosmetics, and biofuels.

Challenges:

- A lack of proper policies regarding sales of the crops causes tons of oilseeds cultivated by farmers to go to waste.
- Lack of infrastructure is a challenge for the government when it comes to implementing new plans for increasing production.
- There are crops such as rapeseed which are perishable products and can easily be destroyed in conditions such as cold weather.
- "GreenHouse Gas Emission" from planting and milling developments.

Leather goods Industry

Leather industry is a very old manufacturing sector producing a broad range of goods such as leather footwear, leather bags, leather garments, and so on. The raw material used in the leather industry is derived from the waste product of the food industry, specifically from meat processing. This waste product is converted into desirable and useful leather products.

Process of Modern leather making

The modern commercial leather-making process involves three basic phases: preparation for tanning, tanning, and processing tanned leather. As a preliminary step, a hide must be carefully skinned and protected both in storage and transportation before reaching the tannery. A hide will begin to decompose within hours of an animal's death; to prevent this from happening, the hide is cured by a dehydrating process that involves either air-drying, wet or dry salting, or pickling with acids and salts before being shipped to a tannery. At the tannery the hide is soaked to remove all water-soluble materials and restore it to its original shape and softness. Hair is loosened usually by a process called liming, accomplished by immersing the hides in a mixture of lime and water; the hair and extraneous flesh and tissue are removed by machine. The hide is then washed, delimed, bated (the enzymatic removal of non fibrous protein to enhance colour and suppleness), and pickled (to provide a final cleansing and softening).

Uses of Leather Goods and Leather products:

There are many uses for leather goods and leather products include clothing, and home decor.

- **Clothing:** Leather is used frequently for clothing items like leather jackets, leather pants, leather dresses, leather blouses, and more.
- **Shoes:** Since leather is a durable and attractive fabric, leather shoes are a popular item. Leather is used to make a variety of footwear, from boots to loafers to high heels.
- **Furniture:** Leather is a popular upholstery material for couches, chairs. Car seats are often also upholstered in leather, and a leather interior is often standard in luxury vehicles.
- **Bookbinding:** Leather is a popular material for binding hardcover books and is used for some book covers. Most leather used for bookbinding is vegetable-tanned, as this makes the leather soft, supple, and easily embossed with information on the book's spine.

Distribution:

The major production centers for footwear, leather and leather products in India are located in:

1. **Tamil Nadu** – Chennai, Ambur, Ranipet, Vaniyambadi, Vellore, Pernambut, Trichy, Dindigul and Erode;
2. **West Bengal** – Kolkata;
3. **Uttar Pradesh** – Kanpur, Agra, Noida, Saharanpur;
4. **Maharashtra** – Mumbai;
5. **Punjab** – Jalandhar;
6. **Karnatak** – Bengaluru;
7. **Telangana** - Hyderabad;
8. **Haryana** – Ambala, Gurgaon, Panchkula, Karnal and Faridabad;
9. **Delhi**;
10. **Madhya Pradesh** – Dewas;
11. **Kerala** – Kozhikode and Ernakulam/Cochin;
12. **Rajasthan**- Jaipur;
13. **Jammu & Kashmir** Srinagar.



Leather Industries in India

Challenges:

- Leather industry is still undeveloped due to the religious sentiments of people involved with animals.
- Companies are reluctant to invest big time in Research and development for the industry.
- Unskilled labours is one of the biggest reason for the stagnant growth of industry

- Companies do not invest in Providing value to the product by giving it good branding.
- Effluent management, non-tariff barriers, quality specifications and cost of compliance to various standards hinder the export growth of the Indian leather industry.
- Environmental issues are linked with leather tanning and processing

Government Initiatives:

- The government has extended the Indian Footwear, Leather and Accessories Development Programme (IFL ADP).
- IFLDP aims at the development of infrastructure for the leather sector, address environmental concerns specific to the leather sector, facilitate additional investments, employment generation and increase in production
- Sub-schemes approved under the programme include sustainable technology and environmental promotion; integrated development of leather sector (IDLS); establishment of institutional facilities; Mega Leather Footwear and Accessories Cluster Development; brand promotion; and development of design studios.
- Development of design studios (proposed outlay ₹100 crore) is a new sub-scheme and it would promote marketing/export linkages, facilitate buyer-seller meets, display designs to international buyers and work as an interface for the trade fairs.
- Under the IDLS, with a proposed outlay ₹500 crore, assistance would be provided to the sectoral units for their modernization/capacity expansion/technology up-gradation on or after 1 January 2020.
- It added that under brand promotion, the government would provide 50 per cent assistance of total project cost subject to a limit of ₹10 crore for each brand in the next three years to promote ten Indian brands in the international market. Goods and Service Tax (GST) Rates for few of the items related to leather industry have been reduced.

Food Processing Industry

- Food processing refers to the transformation of raw edible ingredients into food items. This may be direct manufacturing of food or value addition to an existing food. The objective of food processing is to enhance the shelf-life of food products and value addition to existing food items.

- The food processing process has its roots in ancient times including fermentation, salt, and oil preservation, and sun drying. Modern food processing involves the use of technologies to preserve and value the addition of food.
- Around 50 percent of the Indian population is engaged in agricultural activities. A good food processing industry shall act as a bridge between the agriculture and manufacturing industries. The food processing industry holds the large potential to absorb disguised unemployed masses. They can boost the MSME sector. The food processing industry can be exported and help add revenue to the national income.
- The major sectors in food processing include veggies and fruits, meat, poultry, milk, and grains.

Distribution:

- The food processing industry is one of the largest industries operating in India and is divided into several segments, including fruit and vegetables; meat and poultry; dairy; marine products, and grains and consumer foods (which includes packaged foods, beverages and packaged drinking water). Each segment has a different area of processing resulting in the establishment of Industries all around the country.
- Most of the food processing industries are concentrated in the coastal states. This is because of easy accessibility to marine food.
- Andhra Pradesh, Maharashtra, Karnataka, Kerala, Gujarat, and West Bengal. Punjab and Uttar Pradesh are some of the non-coastal states, which have major food processing industries.
- Maharashtra is the leading state in India as far as food processing is concerned. It has number of industries located for different segments of industries.
- India's diverse soil types and varied climate types for the cultivation of food crops, and long coastal lines for fishing and domesticating animals can help in creating a robust food processing industry.

Advantages of the food processing industry in India:

- Potential to become a global leader:** India is one of the major producers of ginger, banana, guava, mango, and papaya. It is the second-largest producer of rice, wheat, cashew nuts, potato, tea, and sugarcane. It also tops the five largest producers of spices, tobacco, seeds, and coffee. With such large produce India has the potential to become the global leader in the food processing industry.

- Employment opportunity:** The food processing industry provides large employment opportunities.
- Check on rural to urban migration:** As it provides employment opportunities, the rural to urban migration reduces.
- Checks food wastages:** The industry also checks food wastages and removes the issue of middlemen thus transferring the entire profit to the farmers.
- Long shelf life:** The long shelf life of food helps farmers to diversify their products.
- Contribution to nations' GDP:** The food processing industry aggregates 10 percent of the GDP in the agricultural manufacturing sector. India's grocery market is the world's sixth-largest, while, the Indian food processing industry accounts for around 32 percent of the country's total food market.

Government initiatives:

- The government of India has allowed 100 percent FDI in this sector.
- The GoI has launched the National **Mission on Food Processing** with an objective to implement food processing-related schemes and encourage the industry to boost.
- The **Mega Food Park** scheme has been launched to link agricultural production with the market by bringing the farmers, processors, and retailers. This shall ensure increased profits for the farmers and minimized wastage. The scheme operates on a cluster-based approach.
- The GoI has built up the quality monitoring system infrastructure to establish food processing facilities guided by the best research and development.
- The government has launched schemes for setting up cold chains to facilitate preservation. The GoI has initiated many food revolutions along the lines of green revolutions like the white revolution, pink revolution, red revolution, etc.

Heavy Engineering Industries

Automobile Industry

Automobile industry in India flourished in its full-scale post-independence. Before that, assembly work used to take place at various centers. Some of the early operators in the automobile sector were Ford Motors and General Motors. The major automobiles assembled were commercial vehicles, scooters, passenger cars, jeeps, mopeds, motorcycles, and three-wheelers. The Government of India and the private sector made efforts to create an automotive component manufacturing industry to support the automobile industry. The license raj and nationalization slowed the growth of the automobile sector in the 1950s and 1960s. This hampered the private sector to flourish. Post 1970 the automobile sector grew and was mainly driven by tractors, commercial vehicles, and scooters.

Post-1991 economic liberalization in India, the automobile sector grew at a faster rate due to increased competitiveness owing to relaxed restrictions. Major Indian automobile manufacturers like Tata Motors, Hindustan Motors Limited, Ashok Leyland, Hero,



Mahindra and Mahindra, and Maruti Suzuki expanded their domestic and international operations.

The vehicle industry is classified into two major segments- Passenger & Goods vehicles and the two-wheeler segment. Passenger vehicle manufacturing is mostly controlled by state transport undertakings. The private sector mostly manufactures goods and vehicles. The two-wheeler segment comprises scooters, mopeds, and motorcycles.

Distribution:

The automobile sector in India is dependent on the availability of skilled labor at a cheap cost, low cost of steel, and extensive research and development. The automobile industry depends on the finished products of the steel and aluminum industry as raw materials to produce automobile vehicles. Hence, the automobile industries are mostly located near the iron and steel industries.

- 1. Andhra Pradesh:** Penukonda, Sri City, Krishna district
- 2. Gujarat:** Sanand, Rajkot, Ahmedabad
- 3. Haryana:** Manesar, Bawal, Gurugao, Faridabad
- 4. Himachal Pradesh:** Amb, Jamshedpur, Nalagarh
- 5. Jharkhand:** Jamshedpur
- 6. Karnataka:** Mysore, Bengaluru, Bidadi, Dahrwad
- 7. Madhya Pradesh:** Pithampur, Jabalpur, Mandideep, Dewas
- 8. Maharashtra:** Pune, Aurangabad

Significance of Automobile Industry:

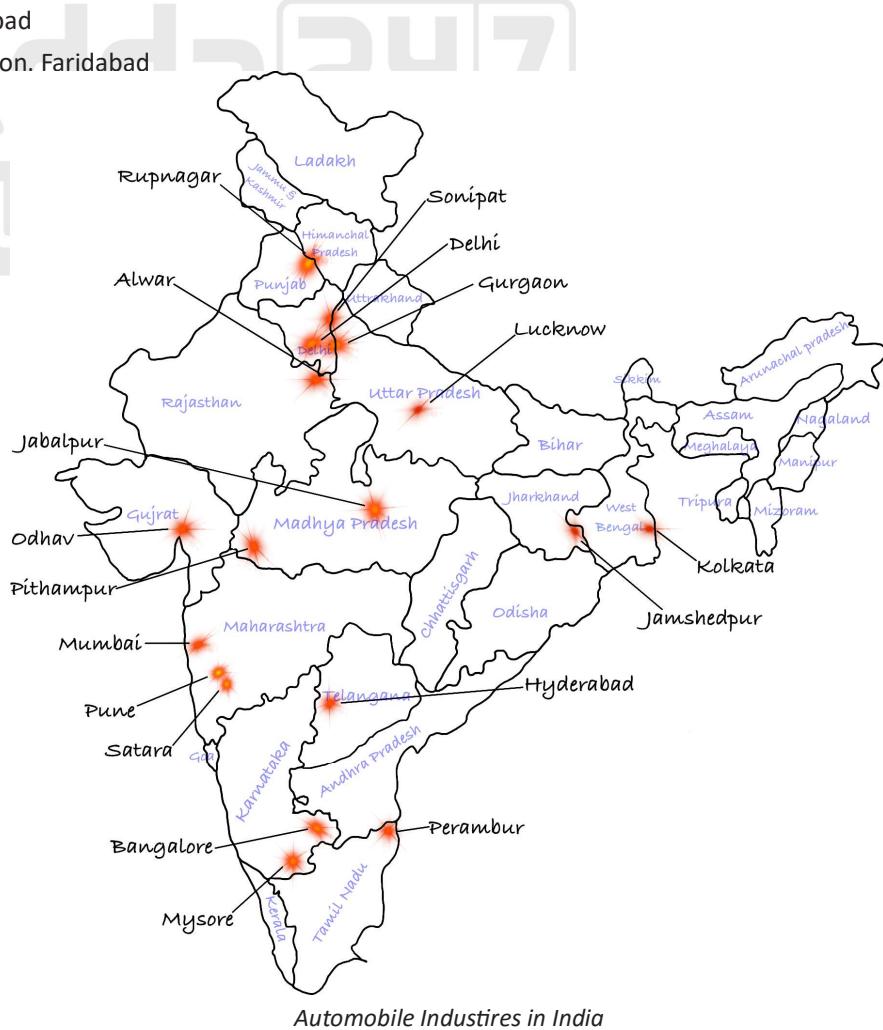
The automobile in India is the largest industry in the world. The automobile industry offers large employment while contributing to the GDP of the country. The automobile sector also boosts the manufacturing sector and the Micro, Small & Medium Enterprises (MSME). It attracts significant investments for the massive potential the Indian market possesses.

Currently, India's two-wheeler market is the second-largest market in the world after China.

In India, the motorcycle segment is one of the fastest-growing. However, the two-wheeler market has low levels of penetration compared to countries like Indonesia, Thailand, and Malaysia. Hence, India possesses a large potential in this segment in near future.

Challenges faced by Automobile Industry:

- **Covid-19:** Economic slowdown due to Covid-19 has reduced the demand for automobiles in the automobile sector.
- **Boost in EVs:** With the rise of EVs and Hybrid Vehicles, new skills are required and throw a threat to the existing employed masses.
- **Fall in demand:** The rise in the prices of automobiles has decreased the demand.
- **Faulty policies:** Large investments made for transition from BSIV and BSVI by the automobile manufacturers as indicated by India's policy on one hand and GoI's rush for EVs are in contrast to each other. This has deteriorated the trust of the policymakers.



Challenges in the Electric and Hybrid vehicle sector:

- **Absence of a robust battery industry:** EVs rely on batteries that store electric energy and later discharge the electric energy to propel the engine. However, India lacks a robust battery manufacturing industry and raw materials (i.e. Lithium reserves) for establishing a robust battery industry. Thus, this might lead to import dependence on countries rich with lithium reserves like China.
- **Environmentally incompatible:** Lithium-ion batteries are too poisonous and required to be recycled cautiously. The recycling process is expensive and might prove harmful to the environment.
- **Lack of infrastructure:** Infrastructure that supports the EVs like charging stations on highways and roads is absent.
- **The surge in electricity:** EV charging might lead to a surge in electricity demand that might put India's already stretched electricity distributions.
- **Long charging hours:** The EVs take long hours to charge (upto 12 hours to fully charge a vehicle).
- **Lack of clarity in policies:** There is a lack of clarity in policy structuring; some manufacturers think the government's target is too ambitious.

Opportunities that the Automobile sector holds for India:

- **Rising middle-class:** The rising middle-class income and huge youth demography create a large demand. India has the potential to become a global leader in the automobile sector by 2030.
- **Employment opportunities:** There are large opportunities for India in **Electric & Autonomous Vehicles**. The electric vehicles or the EVs can create 5 crore job opportunities by 2030.
- **Environment friendly:** The EVs also provide an opportunity to reduce emissions and align with national commitments made by India at the global flora in the environmental arena.

Steps taken by the Government to boost the automobile sector in India:

Some of the major initiatives taken by the Government of India recently are

- **FDI in the Automobile Sector:** The GoI allowed 100 percent FDI under the automatic route.

- **Vehicle Scrappage Policy:** It aims to phase out old polluting vehicles in an environmentally safe manner.
- **PM Gati Shakti Plan:** Expansion of National Highways under **PM Gati Shakti** plan.
- **FAME and FAME II:** Under the (Faster Adoption & Manufacturing of Electric and Hybrid Vehicles in India) FAME and FAME II, India aims to encourage electric vehicles by providing subsidies. This is a part of India's **National Electric Mobility Mission Plan**. Under FAME, GoI plans to establish infrastructure for EVs like, charging stations, and encourage electrification of public transportation.
- **Policy innovations:** Battery swapping policy where drained batteries shall be swapped with the charged ones at designated charging stations.

Railway Equipment Industry

Indian Railways is the fourth largest Railway network in the world after the US, Russia and China. It runs about 20,000 trains carrying more than 2.5 crores passengers and 2.8 million tonnes of freight every day. In terms of passenger kms IR tops the list, with 1046 billion pkm. Indian Railways has become the fourth railway in the world which loads more than a billion tonnes of freight in a year.

Indian Railways is fully independent in the matter of building all its equipment. The industry based on railway equipment was established as 'Peninsular Locomotive Company' at Singhbhum district of Jharkhand in 1921. Later, it was named as 'Tata Engineering and Locomotive Company (TELCO)'.

Research Designs and Standards Organisation (RDSO) is the sole R & D organisation of Indian Railways and functions as the technical advisor to Railway Board, Zonal Railways and Production Units. One of the major roles that RDSO has played is that of developing and maintaining standards and specifications which ensure that all technologies are able to work together as a system.

Do You KNOW?

Three Mountain Railways of India i.e.

1. Darjeeling Himalayan Railway a narrow gauge railways in West Bengal,
2. Nilgiri Mountain Railway, a meter gauge railway in the Nilgiri Hills in Tamil Nadu and
3. Kalka- Shimla Railway, a narrow gauge railway in the Shivalik mountains in Himachal Pradesh, was declared UNESCO world heritage site in 1999.

- The first train; Mumbai to Thane in 1853, covered 34 km.
- As of March 2015, the railway network comprises 66030 km.

Distribution:

Wagons:

The Wagons manufacturing industry is fully geared to meet the rising demand of wagons in railways. Most of the wagons are manufactured by the private sector. There are 13 units with an installed capacity of 30625 wagons(in terms of 4 wheelers) in the private sector and three railway workshops with an actual capacity of about 4000 units. About 60% of wagons are produced in West Bengal, while the rest are produced in Maharashtra, U.P., Punjab and Delhi.

Other railway equipment:

Railway and sleeper bars are manufactured at iron and steel plants at bhilai and jamshedpur. Wheels and axles at Durgapur, Jamshedpur and Rourkela. Coaches and wagons are manufactured both in the public and private sectors.

Ship Building Industry

The Indian ports and shipping industry play a vital role in sustaining growth in the country's trade and commerce. India is the sixteenth-largest maritime country in the world with a coastline of about 7,517 kms. The Indian Government plays an important role in supporting the ports sector. It has allowed Foreign Direct Investment (FDI) of up to 100% under the automatic route for port and harbour construction and maintenance projects.

India has 12 major and 205 notified minor and intermediate ports. Under the National Perspective Plan for Sagarmala, six new mega ports will be developed in the country.

Distribution of Ship building industry:

Ship building is a large industry which requires large capital. At present there are five major shipbuilding centers in India. They are Visakhapatnam Kolkata Kochi Mumbai and Mainmagao. They are all in the public sector. Private sector shipyards look after the local needs. Large ships take years to complete once the work begins. The maximum ships that can be constructed at Kochi and Visakhapatnam are 10000 dead weight tonnage DWT

and 50000 DWT respectively. For repair of ships there are 17 dry docks in India.

Challenges Faced By Shipping Companies In India:

Transportation of shipment through means of shipping companies has numerous advantages like cost-effectiveness and being environmentally friendly. Shipping companies in India have not been able to realize their fullest capacity due to a few constraints. Let's us check out a few challenges faced by shipping companies in India which deter growth in the logistics sector:

1. Institutional Challenges

The rigidity of the Indian bureaucracy and its reluctance to give up control adds to the delay. Multiple involvements of the central, state and local governments with overlapping powers add to the chaos. Lack of a single window clearance system has made it challenging for shipping companies in India.

2. Infrastructural Challenges

Capacities of all major and minor ports in India need to be increased urgently. Due to transhipment points in other countries, the cycle time of Indian cargoes has rendered the uncompetitive on a global scale. Besides this development of road network, electricity and overall infrastructural development is also the need of the hour.

3. Financial Challenges

Shipping companies in India do not have access to any lucrative government schemes that have been available to other channels. The burden of taxes like Customs Duty on Bunkers, Landing Fees, Income Tax etc. without negligible exemptions have made it difficult for shipping companies to thrive.

4. Slow Process

The shipment procedures undertaken by shipping companies is quite cumbersome in comparison to other modes of transportation. This, in turn, wastes valuable shipping time and labour time which goes into the logistic process.

5. Vessel Size

The sizes of vessels are getting bigger owing to the rise in demand for shipping services. While it might sound like an improved trend, many ports in India are still struggling to keep up, and many of these large vessels cannot be called on into most of the ports.

Government Initiatives:

1. Institutional Mechanism on Infrastructure:

Government granted 'infrastructure status' to stand alone shipyards. Infrastructure status would enable

- Indian shipyards to avail cheaper long-term source of capital to Indian shipyards.
2. **Exemption on Duties:** Exemption on Customs and Central Excise duty on inputs used in shipbuilding
 3. **Ship Building Financial Assistance Policy (2016-2026):** India has approved the Financial Assistance Policy for Indian Shipyards, for grant of financial assistance to Indian Shipyards.
 4. **Revision of the criteria for Right of First refusal (ROFR):** This will promote demand of Indian built vessels as the Indian built vessels will have the priority in chartering and will also provide additional market access and business support to ships built in India.
 5. **Integration of Inland and coastal shipping:** Inland Vessels have been allowed to operate within five (05) nautical miles of the baseline (inshore traffic corridor) in fair season and fair weather conditions.

Aircraft Manufacturing Industry

India is currently the ninth largest civil aviation market in the world with a market size of \$16 billion. It is among the five fastest growing aviation markets globally, registering a growth rate of over 15.2 per cent year-on-year.

Distribution:

Different parts of aircrafts are manufactured at different places for security reasons.

- The main divisions of HAL are:
 1. Nashik division where MIG airframes are manufactured.
 2. Koraput division where engine of MIG aircrafts are manufactured
 3. Hyderabad division where electronic equipment of MIG are manufactured.
- Transport aircrafts are manufactured at Kanpur.
- The new aerospace & defense manufacturing facility of Aerolloy Technologies Limited, the wholly-owned subsidiary of PTC Industries has recently been established in Lucknow.

Do You Know?

The first aircraft industry was set up in Bengaluru in 1940 under the name Hindustan Aircraft Ltd. It was a private company and was taken over by the government in 1942. This company was merged into Aeronautics India Ltd. in 1964 to form Hindustan Aeronautics Ltd.

- Hindustan Aeronautics Limited (HAL) at Bangalore now builds military trainer aircraft and has proposed manufacturing new fighter jet designs.
- Hindustan Aeronautics Limited (HAL) has also built helicopters, agricultural aircraft and has one of the largest maintenance depots and engineering services in the world.
- Taneja Aerospace and Aviation Limited is the first private sector aircraft manufacturer in India. It manufactured six-seated twin piston engine aircrafts under license from Partenavia, Italy during 1990's.



Aircraft and Ship Building Plants in India

Challenges faced by the aviation industry:

- **Size limitations:** The current inability to manufacture large and odd-sized parts is one of the biggest challenges of manufacturing within the aviation industry.
- **Quality consistency:** Manufacturing faces certain challenges with quality consistency, especially in producing fully dense metal parts.
- **Scalability limitations:** Companies that use traditional manufacturing and sourcing methods are at risk of stocking very large inventories to deal with unforeseen events, and doing so ties up a lot of capital.
- **High material Cost:** manufacturing technology generally uses a small group of polymers and metal powder to produce aircraft parts for the aviation industry. These are costly materials with much higher price tags than the materials used in traditional manufacturing, lowering the incentives to use additive manufacturing in production.
- **Limited multi-material capabilities:** The fifth and final challenge of additive manufacturing is its inability to produce parts in multiple materials.

Government Initiatives:

- Hindustan Aeronautics Limited (HAL), Kanpur along with the help of Government of India is planning to manufacture Dornier 228 aircraft.
- Pawan Hans, the state-owned helicopter company which plans to diversify into fixed-wing aircraft operations, is also said to be keen on acquiring the Dornier aircraft.
- Boeing and Tata formed a joint venture called Tata Boeing Space Limited, which manufactures the Apache fuselage in India for not only operation within India but internationally as well.
- The ALH-Dhruv (advanced light helicopter) is also being produced by HAL.
- Airbus has “tied up” with the Tata Advance System to replace the AVRO aircraft of the Indian Air Force with Airbus C295

Forest Based Industries

Paper Industry

The use of paper in a society is considered as the yard stick of its development. A nation's intellectual prowess is often linked with the scriptures, documentation and

record keeping. Paper has been used for documentation of knowledge and record keeping after its invention by the Chinese. The Chinese used plant resources to manufacture paper. In India, the Mughals are assumed to have introduced the use of paper for record keeping as their rule expanded. Traditionally it was known as “Kagazi niyam”.

The first modern paper mill was set up in Sreerampore in West Bengal in the year 1832. India inherited the paper manufacturing technology from the west. India has low soft wood reserves as compared to the west. However, with the development of technology that manufactures paper from bamboo, the paper industry got a boost.

Paper industries come under forest-based industries. The prime raw materials for the paper industry are wood and grass. Bamboo, Salai and Sabai grasses, softwood, wheat bran, bagasse, and water are some of the major raw materials. India's rich forest diversity supports the paper industry to thrive and develop. Paper industries are mostly small-scale industries and are highly mechanized in nature. The availability of electricity to run the machines is the major operational requirement.

The paper industry in its journey from 1832 till present has seen many ups and downs. We shall discuss some of the major facets of Paper industries in India.

Locational Factors:

1. **Raw Material:** Wood is the primary raw material for this industry. Pulp mills must be located near the forests because this minimises the difficulty of transporting the bulk logs as well as cost also. In the paper industry softwoods like Spruce, Cedar, Hemlock, Deodar, Eucalyptus, etc., are used. Several pulp manufacturing units are located near the forest to get an abundant supply of wood.
2. **Water:** Paper industry requires a large quantity of water. These conditions are usually available in thinly populated, forested areas rather than in major industrial complexes.
3. **Power:** A ton of newsprint may require about 2,000 kilowatt hours of electricity and thus, vast power sources are essential. Paper plants show an affinity towards cheap hydel-power sources.
4. **Transport:** Transport is one of the most important determinants of paper plant location. The transport cost of newsprint and paper is slightly higher than the transport cost of its raw material. But, on the other hand, raw material reduces its weight considerably during the processing. Whatever may be the cause,

for steady supply of raw material, a good network of transport and communication is a prime requisite.

5. **Capital:** Paper industry is a capital-intensive industry; therefore, large capital is required for sophisticated machinery and other works. The larger the mill the greater the initial costs.
6. **Labour:** Nowadays paper mills are highly mechanised, thus, require lesser manpower. They can be located in remote regions having labour shortage.

Distribution:

Paper industries are located near raw material sources, as they are **weight losing industries**. The weight losing industries refer to the industries in which the amount of raw material required is more than the amount of finished product. In order to save the transportation cost of the raw materials, the weight losing industries tend to locate near the sources of raw materials. Some of the major states that are major producers of Paper are:

- **West Bengal:** Titagarh, Kolkata, Kakinara, and Naihatti.
- **Maharashtra:** Mumbai, Pune, and Ballarpur.
- **Andhra Pradesh:** Rajahmundry.
- **Madhya Pradesh:** Indore, Bhopal, and Sehore.
- **Karnataka:** Belagola, and Shimoga.
- **Odisha:**

West Bengal remains one of the major paper-producing states because of locational advantages. Cheap labor is readily available in the state. Bamboo as raw material is readily available from Assam, Bihar, and Odisha. While some industries use bamboo as raw material. Districts like Karnataka's Belagola and Shimoga are major paper-producing industries that use bagasse as the raw material.

Challenges:

- **Technological constraints:** Obsolete technology still in use is one of the major constraints that is faced by the Paper Industry.
- **Raw material constraints:** The shortage of bamboo and Sabai grass along with chemicals like

bleaching powder, dyes, and caustic soda hinder the paper industry. There is inadequate availability of good quality cellulosic raw materials.

- **High input costs:** The high cost of basic inputs and environmental factors hinder the companies to become globally competitive.
- **Environmentally incompatible:** Along with deforestation, the paper industry is also a major water-polluting industry.

Do You KNOW?

Advantages of the paper industry of India over the west:

1. Cheap labour as compared to the western countries.
2. The growth cycle of softwood in Indian tropical forests is 6 to 7 years, while the growth of conifers in the west is around 50 years.

Government Initiatives:

Steps that have been taken to overcome issues pertaining to the paper industry are:



Paper Industries in India

- Recycling and reusing of fibers have been emphasized to make the production environment friendly.
- Agro-forestry and plantation forestry has been encouraged to meet raw material shortages.
- Bagasse** (a by-product of sugarcane) is used as a raw material in the paper industry. Earlier bagasse was used as a fuel in the sugar industry. With this shift in approach, the already loss-making sugar industry managed to earn some profit.
- Indian Paper Manufacturers Association (IPMA) in its pre-budget submission to the finance ministry, proposed allowing pulpwood plantation in degraded land.

India with over 16 percent of the world's population consumes only 1 percent of the world's paper and paper board. With the spread of literacy, the demand for paper and paper products is likely to increase. Hence, the need at the time is adequate research to develop new methods to optimize the production of paper and counter disposal of effluent issues.

Rubber Industry

The Rubber industry has established itself as a major industry in India. In a few years time India is likely to become the second largest global player in this sector. India ranks high in natural rubber production. It is largely produced in Kerala but its production is growing in North-East India. Both Natural rubber and synthetic rubber play a complementary role in providing the desired end properties to final rubber products made of it. The share of synthetic rubber in total rubber consumption in India is around 30% while the world average is 65%. As such the Government encourages establishment and development of synthetic rubber plants in India. The Indian domestic market has the capacity to consume the entire indigenous production of natural rubber.

Rubber Usage in different sectors:

- Automotive tyre sector: 50% consumption of all kinds of rubbers
- Bicycles tyres and tubes: 15%
- Footwear: 12%
- Belts and hoses: 6%
- Camelback and latex products: 7%
- Other products: 10%

Do You KNOW?

- India is the third largest producer of rubber in the world.
- It is the fourth largest consumer of natural rubber.
- It is the fifth largest consumer of natural rubber and synthetic rubber together in the world.
- India is the world's largest manufacturer of reclaim rubber.

Distribution:

Rubber producing regions in India are divided into two zones – traditional and non-traditional.

Traditional zones are: Kanyakumari in Tamil Nadu and a few districts of Kerala.

Non- Traditional zones are: Coastal regions of Karnataka, Goa, Andhra Pradesh, Orissa, Northeastern states mainly Tripura, Andaman and Nicobar Islands, Few areas of Maharashtra.

Challenges:

- A decline in the productivity per hectare of rubber produce region.
- Higher labour cost with constant fall in prices of natural rubber.
- Tyre companies are turning towards massive imports of rubber from foreign countries, which led to the decline in Domestic demand.
- There are high input costs required for rubber manufacturing.
- Bizarre duty structure, cheap imports and signing of Free Trade Agreements are other reasons for fall in rubber production.

Government initiatives:

- The Ministry of Commerce & Industry, Government of India, established the Rubber Board in 1947 to strengthen the development of the rubber industry by offering financial assistance, consultatory and regulatory services.
- The board launched the National Rubber Policy in March 2019 to address the external and internal challenges faced by the Indian rubber industry.
- Four major tyre companies represented by Automotive Tyre Manufacturers Association (ATMA) have together undertaken to contribute Rs.1,000 crores for rubber plantation development in 200,000 hectare land in the Seven states of North East India,

over a period of five years. A Memorandum of Understanding was signed between Rubber Board and ATMA on 1 March 2021.

Mineral Based industries

Iron & Steel Industry

Iron is a metal that is extracted from iron ore. Iron ores are the raw materials that are mostly composed of iron metal and other sediments along with natural rocks. The iron ores are found abundantly in the Earth's crust. The iron ore is found in the form of **Magnetite**, **Hematite**, **Goethite**, **Limonite**, and **Siderite**. The iron ore is later fed into the blast furnace accompanied by other beneficiation processes to obtain the **Pig Iron**. Pig iron is a form of crude iron that is the prime raw material to manufacture **Steel**. Steel is an alloy that is made up mainly of iron, carbon, manganese, and chromium.

The iron and steel industries are the backbones of any country. It is the basic industry for the development of any country. It signifies the degree of modernity of a country. They provide a country with an industrial infrastructure with a strong forward and backward linkage. These industries are very critical to the regional development of the underdeveloped region.

Development of iron and steel industry in India:

The dependencies of other industries are on the iron and steel industry. The intermediate machinery is manufactured in the iron and steel industry. Therefore the extent of industrialization in any country is usually measured in terms of per capita consumption of steel.

The first industrial unit that was able to produce pig iron successfully in India came up at **Kulti** in **1874**. In **1907**, the Tatas set up a plant in **Sakchi** (now known as **Jamshedpur**) called **TISCO** (Tata Iron and Steel Company). It is the oldest iron and steel company in India. In **1919** the **IISCO** (Indian Iron and Steel Company) was set up in **Burnpur**. The TISCO plant at **Jamshedpur** is based on the Haematite iron ores from **Gurumahisani** mines in the **Mayurbhanj** district of **Odisha** and from the **Noamundi** mines in **Singhbhum** district of **Jharkhand**.

The iron and steel industry was remarkably emphasized at the policy level from the second five-year plan (1956 to 1961) onwards. Three steel plants were established under Hindustan Steel Limited.

1. Rourkela Steel Plant, in Odisha, with the help of Germany.

2. Bhilai Steel Plant, in Chhattisgarh, with the help of Russia.
3. Durgapur Steel Plant, in West Bengal, with the help of the United Kingdom.

The Bokaro steel plant was established with the help of Russia. In 1973, the Steel Authority of India Limited was formed under which all the major public sector steel plants came under its ambit.

In 1991 economic reforms that were initiated by the GoI gave an impetus to the private sector to participate in the steel industry. With abolishing of trade restrictions and the requirement of licenses there was the mobilization of resources from overseas markets. The steel industry was removed from the list of industries that were reserved for the public sector. The automatic approval was granted with a foreign equity investment of up to 100 percent. With economic liberalization, the export of steel recorded a quantum jump.

Significance of the iron and steel Industry:

- The index of modernity is measured by the development of the steel industry of a country.
- India is the second-largest producer of steel in the world and the largest producer of sponge iron in the world.
- With the rise of the iron and steel industries, regional development has steadily grown. They generate large employment opportunities directly and indirectly.
- The development of the iron and steel industries also leads to the development of the automobile industry, road, railways, airways, and shipping industries.
- They add to the revenue of the country with increased exports. There is a requirement for modernizing, upgrading, and replacement of obsolete technologies and equipment.
- An emphasis should be given to the green climate fund to procure environment-friendly technologies.
- Anti-dumping duties should be taxed on cheap imports so that the domestic producers can be protected. The restructuring of the infrastructure and automobile industry can help increase the domestic demand for the iron and steel industry.
- The GoI has launched a **steel production linked incentive (PLI)** to give an impetus to the steel industry. MoUs are signed with various countries like Russia and Japan to conduct research and development on steel. The budget is focusing on more infrastructure and the manufacturing sector as a result of which the iron and steel sector gets a boost.

Geographical distribution of iron and steel industry in India:

For the processing of iron ore two important minerals are required, the limestone and the coking coal. Other materials that are required for the iron and steel industry are water and power. Hence, most of the iron and steel industries tend to locate near coal plants and rivers. At times to cut the transportation costs of imported coal or export finished goods iron and steel industries are located near ports.

Some of the major steel plants located in India are in:

- West Bengal,
- Chhattisgarh,
- Odisha,
- Jharkhand,
- Maharashtra,
- Andhra Pradesh,
- Karnataka,
- Tamil Nadu, and
- Gujarat.

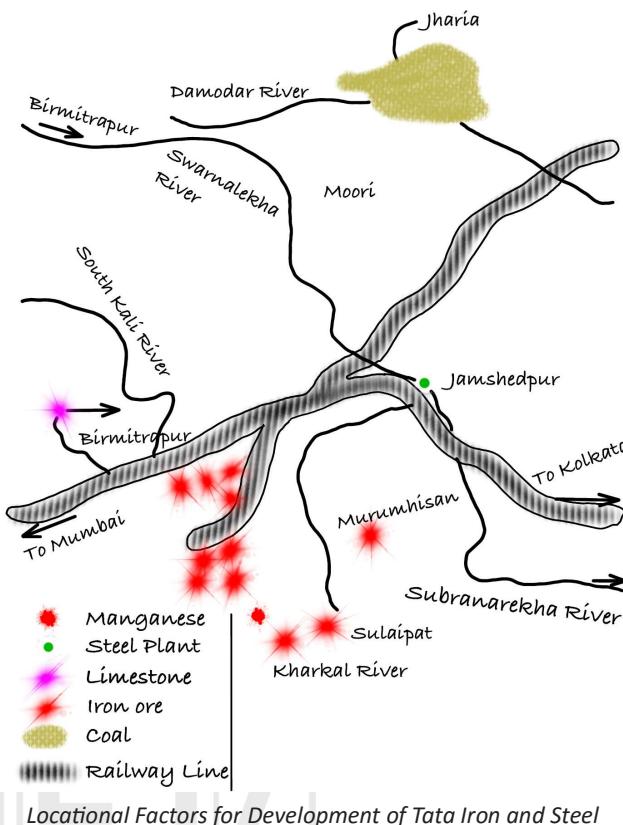
Case Studies:

1. TISCO (Tata Iron and Steel Company)- Jamshedpur

The TISCO plant at Jamshedpur is the oldest iron and steel plant in India.

Locational factors:

- **Iron ore:** The raw material iron ore (Haematite) is imported from Gurumahisani mines in the Mayurbhanj district of Odisha and the Noamundi mines of Singhbhum district of Odisha.
- **Coal:** Coal is brought from the nearby Jharia mines in Jharkhand and Raniganj mines in West Bengal.
- **Manganese:** Manganese is supplied from the Joda mines of the Kedujhar district in Odisha.
- **Limestone:** Limestone is supplied from the Sundergarh district of Odisha.
- **Water:** Water is derived from the nearby Subernarekha River.
- **Cheap labor:** Cheap labor is available from Jharkhand and Odisha.
- **Transportation facilities:** The Jamshedpur Steel plant is facilitated by nearness to the port (Paradwip port, Odisha) and National Highway -6 (Mumbai-Kolkata).



2. IISCO (Indian Iron and Steel Company)- Kulti-Hirapur-Burnpur

IISCO was established in the year 1918 with units operating at Kulti, Burnpur, and Hirapur in the Bardhaman district of West Bengal.

Locational factors:

- **Iron ore:** The iron ore is obtained from Pansiraburu and Gua iron mines in the Singhbhum district of Jharkhand.
- **Coal:** Coal is procured from Raniganj coal mines while the coking coal is obtained from the Jharia mines of Jharkhand.
- **Limestone and Manganese:** Limestone and Manganese are obtained from Gangapur in Odisha.
- **Water:** The water is obtained from the Damodar River and the hydro-power electricity is obtained from the Damodar Valley Corporation (DVC)
- **Transportation:** The Delhi-Kolkata highway and the port facilities of Kolkata help in the movement of the finished goods.

3. VSL (Visvesvaraiya Iron and Steel Limited)- Bhadravati

The iron and steel industry is situated on the left bank of the Bhadra River. Initially, the company was set up in the year 1923 as the Mysore Iron and Steel Company Ltd. as a private undertaking. Later the company became a public undertaking in the year 1962 and is known by the name Visvesvaraiya Iron and Steel Limited (VSL).

Locational factors:

- Iron ore:** The iron ore is procured from Kemangundi in Bababudan hills located south of Bhadravati River.
- Hydro-electric power:** Initially charcoal obtained from the forests of Western Ghats was used instead of coal. Now the electricity from the Mahatma Gandhi and the Sharavati hydroelectric power centers are used.
- Limestone:** Limestone is obtained from Vandigudda.
- Manganese:** Manganese is obtained from Shimoga and Chitradurga.
- Water:** Bhadra River supplies the required water for the plant.

4. Rourkela Steel Plant- Odisha

The Rourkela Steel Plant is the first steel plant in India to be set up post-independence in the Sundergarh district of Odisha in the year 1956. The steel plant was built in collaboration with Germany as envisaged in the second five-year plan.

Locational factors:

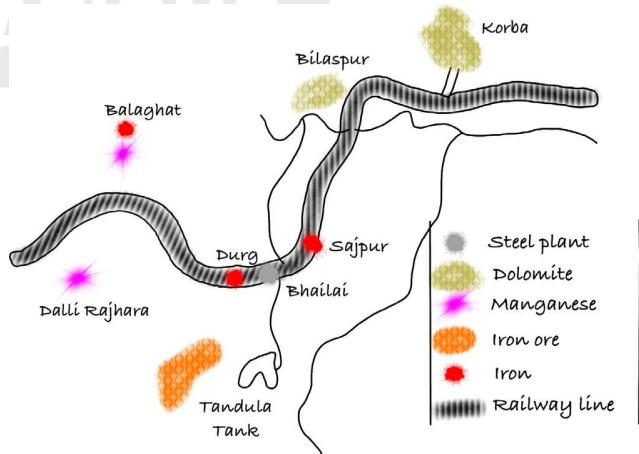
- Iron ore:** The iron ore is procured from the Mayurbhanj, Keonjhar, Barsuna, and Bonai mines located in the north of Odisha.
- Coal:** Coal and coking coal is obtained from Bokaro, Talcher, Jharia, and Korba coalfields.
- Manganese:** The Manganese is procured from Biramitrapur in the Sundergarh district of Odisha.
- Limestone:** Limestone is obtained from Gangapur.
- Electricity:** The Hirakud project supplies required electricity to the Rourkela steel plant.
- Water:** The Rourkela Steel Plant is set up on the banks of the Brahmani River (near the confluence of the Sankha and Koel rivers). The water supplied from the water storage dams are constructed across the rivers Sankha and Brahmani.
- Transportation:** The transportation facilities are provided by the Kolkata-Bombay railway line and the port of Vishakhapatnam provides the sea outlets.

5. Bhilai Steel Plant- Chhattisgarh

The Bhilai Steel plant is the largest steel plant in India. The steel plant was the second steel plant constructed post-independence. The steel plant was set up during the second five-year plan with the help of the USSR.

Locational factors:

- Iron ore:** The iron ore is procured from Dhalli-Rajhara iron mines.
- Coal:** Coal is obtained from Jharia, Raniganj, and Korba coalfields.
- Manganese:** The Manganese is procured from Balaghat mines in Madhya Pradesh and Bhandara mines in Maharashtra.
- Limestone:** Limestone is obtained from Nandini mines located north of Bhilai.
- Electricity:** The Korba Thermal Power Station supplies electricity.
- Water:** The water is supplied from the Tendula canal.
- Transportation:** The transportation facilities are provided by the Kolkata-Bombay railway line.
- Cheap Labour:** The cheap labor required for the plant is readily available from Maharashtra, Bihar, Madhya Pradesh, and Chhattisgarh.



Locational Factors for the Development of Bhilai Steel Plant

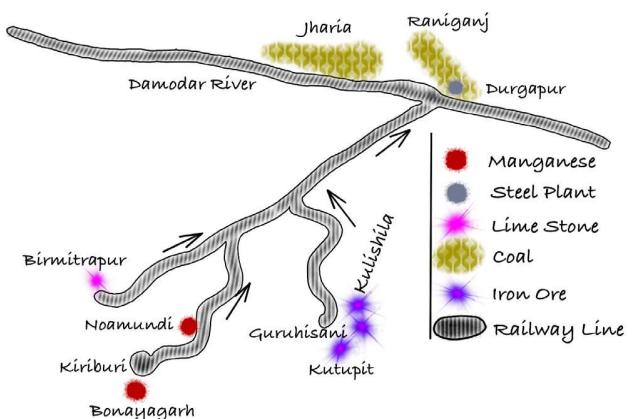
6. Durgapur Steel Plant- Bardhaman

The Durgapur Steel plant is located in the Bardhaman district of West Bengal. The steel plant was set up during the second five-year plan in collaboration with the British. The steel plant started production from 1962 onwards.

Locational factors:

- Iron ore:** The iron ore is procured from Keonjhar mines in Odisha and Singhbhum mines in Jharkhand.

- Coal:** Coal is obtained from Jharia, and Raniganj coalfields.
- Manganese:** The Manganese is procured from Barbil and Bonai mines in Odisha.
- Limestone:** Limestone is obtained from Birmitrapur in Odisha.
- Water:** The water is supplied from the Damodar River.
- Transportation:** The transportation facilities are provided by the Kolkata-Bombay railway line and Kolkata port.
- Cheap Labour:** The cheap labor required for the plant is readily available from Bihar, Jharkhand, Madhya Pradesh, and Odisha.



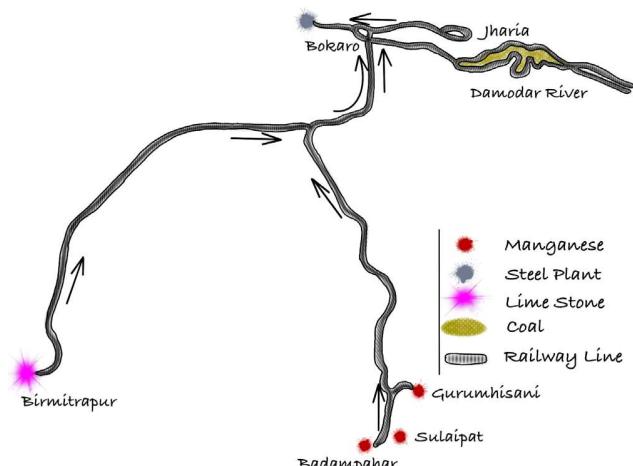
7. Bokaro Steel Plant- Jharkhand

The Bokaro Steel plant is regarded as the most ambitious steel plant project in India. The steel plant was set up during the fourth five-year plan in collaboration with the Soviet Union and the Steel Authority of India Limited (SAIL). The steel plant started production from 1972 onwards.

Locational factors:

- Iron ore:** The iron ore is procured from Kiriburi mines, Noamudi mines, and Gua mines in Jharkhand.
- Coal:** Coal is obtained from Jharia and Bokaro coal mines.
- Manganese:** The Manganese is procured from Hiri mines in Chhattisgarh.
- Limestone:** Limestone is obtained from Daltonganj and Latehar in the state of Jharkhand.
- Water:** The steel plant is located near the confluence of the rivers of Damodar and Bokaro in the Giridih district of Jharkhand. The water is supplied from Tenughat Dam which is located on the river Damodar.

- Transportation:** The transportation facilities are provided by excellent road and rail routes.
- Cheap Labour:** The cheap labor required for the plant is readily available from Bihar, Jharkhand, Madhya Pradesh, and Odisha.



8. Salem Steel Plant- Tamil Nadu

The plant is located in the Salem district of Tamil Nadu. The steel plant was set up during the fifth five-year plan and is managed by the Steel Authority of India Limited (SAIL). The steel plant started the production from 1982 onwards.

Locational factors:

- Iron ore:** The iron ore is procured from Salem mines.
- Coal:** Coal is obtained from coal mines in Neyveli located in Tamil Nadu.
- Manganese:** The Manganese is procured from Tumkur in Karnataka.
- Electricity:** The electricity is supplied by the Mettur hydroelectric power center located on river Cauvery.
- Water:** The water is supplied from the river Cauvery.
- Transportation:** The transportation facilities are provided by excellent road and rail routes and the port of Chennai.

Challenges faced by the iron and steel industry:

- Steep Competition:** The iron and steel industry faces steep competition from an increase in cheap imports from China, Korea, Russia, and Japan. Currently, India is a net importer of total finished steel at present.
- Scarcity of raw materials:** Indian iron ore has a higher percentage of gangue materials (the commercially worthless materials accompanied by iron). Thus, compelling the industries to import higher grades of iron ore.

- **Cheap imports:** The cheap imports have skewed the domestic market of India with poor demand and price slump of Indian steel in India.
- **Obsolete Technologies:** The Public Sector Undertakings (PSUs) still use obsolete technologies. Till the 1960s and 1970s, India had advanced technology from the west, the plant efficiency was high. Post-oil crisis, the energy costs, and other inputs have increased, thus, reducing the profit.
- **Inadequate supply:** Insufficient supply of coal and power supply has led to under-utilization of the industries and restricts from operating at full efficiency.

Copper Industry

Copper is one of the most important elements and is the oldest known commodity in the world. A widely used metal in various sectors, copper is the third most used metal in terms of world consumption, after steel and aluminium. Copper and its alloys are used in a variety of industries, the largest user being the electricity sector owing to copper's easy availability, affordability, not to mention that it is a good conductor of electricity.

Copper industry is divided into two parts:

1. **Primary:** Primary sector comprises the producers that convert ore into refined form of copper. The three companies that handle India's copper sector, Birla Copper, Sterlite Industries and Hindustan Copper Ltd form this sector. Their task is conversion of copper ore into refined copper.
2. **Secondary:** Secondary sector is made up of producers that process refined copper to manufacture products like wires, foil etc. for consumption by the rest of the industries.

Distribution:

- Madhya Pradesh: Taregaon area, the Malanjkhand belt of the Balaghat district.
- Rajasthan: Khetri, Ajmer, Alwar, Bhilwara, Chittorgarh, Dungarpur, Jaipur, Jhunjhunu, Pali, Sikar, Sirohi, and Udaipur.
- Jharkhand: Singhbhum, Hasatu, Baraganda, Jaradih, Parasnath, Barkanath, etc. in Hazaribagh district;

Challenges:

- Cheap refined copper imports from Japan and other ASEAN countries has decreased the operating capacity of Indian makers to about 75%

- The free trade agreements by the government which allow import of duty free copper, can make India's own sector redundant.
- Imports from Japan and ASEAN countries have almost doubled.

Government initiatives:

- Government has made changes to the Mines and Minerals (Development and Regulation) (MMDR) Act. The Act empowers the central government to reserve any mine to be leased through an auction for a particular end-use.
- To boost recycling of copper in India, the government announced reduction of import duty on copper scrap from 5% to 2.5% in the Union Budget 2021.

Aluminium Industry

- Aluminium Industry is the second most important metallurgical industry in India. It has gained popularity as a substitute of steel, copper, zinc and leads in a number of industries because it is light metal, resistant to corrosion, a good conductor of heat, malleable and becomes strong when it is mixed with other metals.
- The plant for obtaining Alumina from bauxite ore for aluminium plants is located near the cheap sources of energy i.e., electricity & hydel power supply.
- The Aluminium industry comprises of two basic segments:
 - ◆ **Upstream sector:** Here Aluminium from raw materials are produced via bauxite mining.
 - ◆ **Downstream sector:** Here Aluminium is processed into semi-finished Aluminium goods such as rods, bars, castings, forging, etc.

Distribution:

1. **Orissa:** Kalahandi and Koraput districts
2. **Jharkhand:** Ranchi, Lohardaga, Palamu and Gumla districts. Some bauxite is also found in Dumka and Munger districts.
3. **Maharashtra:** Dhanganwadi, Radhanagari and Inderganj in Kolhapur district
4. **Chattisgarh:** Maikala range in Bilaspur, Durg districts and the Amarkantak plateau regions of Surguja, Raigarh and Bilaspur
5. **Madhya Pradesh:** Shahdol, Mandla and Balaghat districts and the Kotni area of Jabalpur district.

Challenges:

- High power cost & power shortage are the major problems in the development of Aluminium industry
- Old technology: Smelter units are old and consume more power resulting in higher cost of production.
- Vast deposits of bauxite discovered in the east coast of India are still unutilized.
- High cost of input makes it difficult for Indian industries to compete in the international market.
- Essential raw materials, like cryolite & fluoride are still imported.
- Non availability of cheap power is also one of the main reasons for the growth impediments of Industry in India.
- Labour Strikes create challenges in the growth of Aluminium Industry in India.

Government Measures:

- Exploration of minerals including iron ore, bauxite and manganese are being encouraged to meet the needs of the industry and as many as 100 different new mines in the country are now ready.
- The Center has taken concrete steps to deal with the impact of mining activities on the people as well as environment by forming District Mineral Foundation (DMF).
- The aluminium industry has urged the government to fix RoDTEP (Remission of Duties and Taxes on Exported Products) at 5%.

Lead Smelting Industry

Lead is a widely used metal due to its malleability, softness, heaviness and bad conductivity of heat. The most important industrial use of lead is as a constituent in alloys such as type metal, bronzes and anti-friction metal. Lead oxide is used in lead sheeting, cable covers, ammunition, paints, and glass making and rubber industry.



Aluminium Industries in India

It is also made into sheets, tubes and pipes which are used in buildings, especially as sanitary fittings. It is now increasingly used in automobiles, aeroplanes, typewriters and calculating machines. Lead nitrate is used in dyeing and printing.

Lead does not occur free in nature rather it occurs as a cubic sulphide known as galena. Galena is found in veins in limestones, calcareous slates and sandstones and occasionally in metamorphic rocks or in association with volcanic rocks.

Distribution:

The first lead smelting plant was set up at Tundoo near Dhanbad (Jharkhand) in 1942-43 by a private company named as the Metal Corporation of India. The commercial production by this plant commenced in 1945.

Rajasthan is the leading producer: (Zawar mines)
Udaipur, Anguncha-Rampura in Bhilwara

Andhra Pradesh Cuddapah are the main lead producing districts.

Gujarat: Banaskantha Vadodara, Panchmahal and Surat

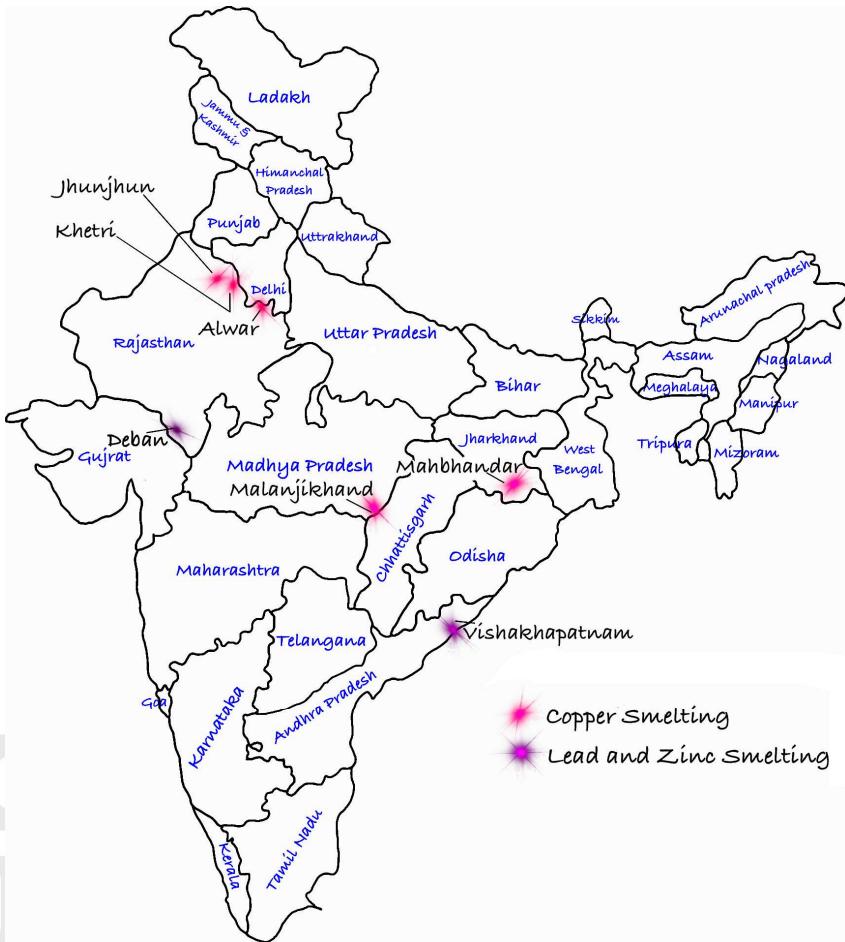
Zinc Smelting Industry

Zinc is a mixed ore containing lead and zinc and is found in veins in association with galena, chalcopyrites, iron pyrites and other sulphide ores. It is mainly used for alloying and for manufacturing galvanized sheets. It is also used for dry batteries, white pigments, electrodes, textiles, die-casting, rubber industry and for making collapsible tubes containing drugs, pastes and the like.

Zinc is generally used for the galvanizing purpose, which helps to prevent corrosion of steel and iron. In India as well, the major demand for zinc was from the galvanizing industry. There was considerable demand for zinc from other industrial sectors such as the coating sector and die casting alloy sectors. Globally as well, most end users of zinc were from the galvanizing industry.

Distribution:

- Zinc smelting is the process of converting zinc concentrates (ores that contain zinc) into pure zinc.
- The most common zinc concentrate processed is zinc sulfide, which is obtained by concentrating sphalerite using the froth flotation method.
- Few of the zinc smelting industries are located in:
 1. Rajasthan: Debari and Chanderia
 2. Kerala: Alwaye
 3. Andhra Pradesh: Visakhapatnam
 4. Jammu and Kashmir: Udhampur
- Secondary (recycled) zinc material, such as zinc oxide, is also processed with the zinc sulfide.
- Approximately 30% of all zinc produced is from recycled sources.
- The Highest producer of zinc is Rajasthan. Small quantity of zinc is produced in Sikkim.
- Some deposits containing zinc are also found in Udhampur district of Jammu and Kashmir, and South Arcot Vallalar district of Tamil Nadu.



Copper, Lead and Zinc Smelting Industries in India

Do You Know?

Hindustan Zinc is India's largest and world's second largest zinc-lead mine.

Cement Industry

India is the second largest cement producer in the world and accounted for over 7% of the global installed capacity. India's overall cement production capacity was nearly 545 million tonnes (MT) in FY22. Of the total capacity, 98% lies with the private sector and the rest with the public sector. The top 20 companies account for around 70% of the total cement production in India. As India has a high quantity and quality of limestone deposits through-out the country, the cement industry promises huge potential for growth. The housing sector is the key contributor to the cement industry growth. It is estimated that about 60% of cement is consumed by the sector. Demand is further getting fuelled by the non-trade segment, which is gaining momentum with the

resumption of construction work of public infrastructure projects such as roadways and metros, after the lockdown.

Uses of cement:

Some of the numerous functions of cement are given below.

1. It is used in mortar for plastering, masonry work, pointing, etc.
2. It is used for constructing joints for drains and pipes and maintaining the tightness of structure.
3. It is used in concrete for laying floors, roofs and constructing lintels, beams, stairs, pillars etc.
4. It is used in the construction of important engineering structures such as bridges, culverts, dams, tunnels, lighthouses etc. It is also used in the preparation of foundations, watertight floors, footpaths etc.

Locational Factors:

Manufacturing of cement requires low, heavy value and weight loose materials. It is primarily a raw material oriented industry. The main raw-material of the cement industry is Limestone. It comprises 60-65% of the total product. On an average 1.5 tonnes of limestone are required to produce one tonne of cement. Hence, mostly the location of a cement plant is dependent upon limestone deposits.

Distribution of Cement Industry:

Major cement productive states are the following:

1. **Tamil Nadu:** Durg, Shankar, Pulpur, Aaila, Dalmiapuram, Madurai, Alugang etc.
2. **Madhya Pradesh:**– Jamul, Satna, Ankle Tara, Banyor, Neemuch, Maihar, Kaisun, Gopal Nagar, Gwalior, Katni and Damoh etc.
3. **Andhra Pradesh:** Machraila, Mangalgiri, Panyam, Krishna, Vijayanagar, Tandur, Mancherial, Yerragutla, Bugnipali, Kistrina, Perampalli, Nalgonda, Hyderabad, Adilabad etc.

4. **Rajasthan:** Lakheri, Udaipur, Nimbahera, Chittorgarh, Beawar etc.
5. **Gujarat:** – Sikka, Okhla Mandal, Ahmedabad, Porbandar, Dwarka, Ranavab etc.
6. **Karnataka:** – Bagalkot, Bari, Bhadrawati, Bengaluru, Kurkanta, Shahbad, Aamsandra, Bijapur, Gulbarga, Tulkur etc.
7. **Jharkhand:** – Sindri, Khelari, Japla, Dalmia Nagar, Chaibasa, Banjari, Kalyanpur etc.
8. **Uttar Pradesh:** Churk, Chopan and Chunar are the new major cement producing districts.

Other areas:

Besides, these in Haryana – Surajpur, Charkhi Dadri, In Maharashtra – Chandrapura, In Odisha- Hirakund, Rajagpura, In Kerala – Kottayam, In Jammu and Kashmir – Bruyan and in Meghalaya small cement plants are established.



Challenges of Cement Industry:

1. **Poor government infrastructure spending:** Due to the resource crunch, the government has reduced its spending on the infrastructure sector. It has simultaneously resulted into lesser demand from cement industry.
2. **High lending rates:** Banks lending prices are touching a new high, so the cement industry is unable to meet its working capital requirements as well as its capital expenditure programme.
3. **Poor availability of Coal:** Coal is an important input in the cement industry. The availability of coal has become a contentious issue for the industry, as Coal India Limited prioritises supplying coal to the power sector before supplying it to the cement industry.
4. **Power shortages:** Manufacturing of cement requires continuous power supply but inadequate power cuts impacted the efficiency of cement manufacturing.

Government Initiatives:

- In October 2021, Prime Minister, Mr. Narendra Modi, launched the 'PM Gati Shakti - National Master Plan (NMP)' for multimodal connectivity. Gati Shakti will bring synergy to create a world-class, seamless multimodal transport network in India. This will boost the demand for cement in the future.
- In July 2021, the government established a council of 25 members (comprising UltraTech Cement MD Mr. K C Jhanwar, Dalmia Bharat Group CMD Mr. Puneet Dalmia) for the cement industry to reduce waste, achieve maximum production, enhance quality, reduce costs and encourage standardisation of products.
- Under the housing for all segments, 8 million households will be identified according to the Budget 2022-23 with Rs. 48,000 crore (US\$ 6.44 billion) set aside for PM Awas Yojana.
- As per the Union Budget 2022-23, the government approved an outlay of Rs. 1,99,107 crore (US\$ 26.74 billion) for the Ministry of Road Transport and Highways, and this step is likely to boost the demand for cement.
- The Union Budget allocated Rs. 13,750 crore (US\$ 1.88 billion) and Rs. 12,294 crore (US\$ 1.68 billion) for Urban Rejuvenation Mission: AMRUT and Smart Cities Mission and Swachh Bharat Mission.

Chemical based Industry

Chemical industries are vital to the primary and secondary sectors of the economy. The raw materials are used in the manufacturing of other products. Some of the basic chemicals that are used for industrial purposes are sulphuric acid, caustic soda, soda ash, pesticides, and insecticides. The chemical industry in India has considerably developed post-1991 liberalization of Industrial Policy. The growth has been higher in this sector than the growth rate of any other industry.

The chemical industry can be classified into two segments:

1. The heavy inorganic chemical industry segment.
2. The heavy organic chemical industry segment.

Heavy inorganic chemical industry

Some of the major inorganic chemical industries in India are **Sulphuric acid**, **Nitric acid**, **Alkalies industry**, **Soda ash**, and **Caustic soda**.

Sulphuric Acid:

It is an important ingredient for manufacturing fertilizers, plastics, synthetic fibres, paints and dyestuffs. It is often used in metallurgy, leather tanning and oil refining. Sulphuric Acid is manufactured from sulphur which is not available in appreciable quantity in India.

About 90% of the sulphur has to be imported.

There are around hundred units engaged in the manufacture of sulphuric acid. About 80% of the production comes from Kerala, Madhya Pradesh, Maharashtra, Gujarat, Tamil Nadu, Chhattisgarh and West Bengal.

Nitric acid:

Nitric Acid's production and use is associated with fertilizer plants and explosives. The main producer is the Trombay unit of Fertilizer Corporation of India.

Alkalies:

Demand for alkalies is growing very fast and they form an important segment of the inorganic chemical industry. The manufacturing of alkalies requires heavy and weight losing raw materials for eg. common salt, limestone and coal.

In comparison to the weight of the raw materials, the final product has less weight. This industry also requires cheap electricity in abundance. Thus the plants manufacturing alkalies tend to be located near the source of raw materials, market and electricity. The alkali

industry comprises soda ash, caustic soda, liquid chlorine, calcium carbide, etc.

Soda Ash:

It is used in the manufacture of soaps, glass, paper and detergents. Two chief raw materials used in the manufacture of soda ash are sodium chloride and limestone which are majorly found in Gujarat. Okha, Mithapur and Dhrangadhra are important centres of manufacturing soda ash.

The other centres are Nangal, Sutrapada, Varanasi and Tuticorin.

Caustic Soda:

The caustic soda industry has grown steadily since the first plant. It meets the needs of end-user industries like textiles, soaps and detergents and alumina. Chlorine is its byproduct which is an important chemical used in paper and pulp, soaps, water treatment and detergents, textiles and other large variety of industries.

The industry is growing at a rate of 6% p.a. in India whereas, internationally, the growth rate is around 2%.

The basic raw material used for manufacturing caustic soda is common salt which is available in plenty in India. The major producing centres are Kalyan, Porbandar, Thane, Mithapur and Titagarh.

Heavy organic chemical industry

Petrochemicals constitute the major portion of the organic chemical industry. Petrochemicals are the organic chemicals that are drawn from crude petroleum in the refining process. The chemicals are mostly used for producing synthetic rubber, insecticides, synthetic fiber, drugs, pharmaceuticals, and plastic. The petrochemical industry has been subgrouped into the **polymer, synthetic fibers, elastomers**, etc.

Major locations in India that are concentrated in petrochemical industries are **Auraiya (Uttar Pradesh)**; **Jamnagar, Gandhar, Hazira (Gujarat)**; **Ratnagiri (Maharashtra)**; **Haldia (West Bengal)**, and **Vishakhapatnam (Andhra Pradesh)**. Most of the petrochemical industries are found near the refineries.

Fertilizer Industry

The Indian fertilizer industry is progressive in terms of Nitrogen-based fertilizers. India is the 2nd largest consumer of Urea fertilizers after China. India is ranked 2nd in the production of nitrogenous fertilizers and 3rd in phosphatic fertilizers. The requirement of Potash is met through imports because we have limited reserves of potash. Famous PSUs are The Fertilizer Corporation of India Ltd, National fertilizers Limited, Hindustan Fertilizer Corporation Ltd., etc.

Two types of Fertilizers are present:

- **Primary Fertilizers:** they are classified on the basis of nutrients supplied to soil like N:P:K:
 - **Nitrogenous (Urea):** Phosphatic (di-ammonium phosphate - DAP): Potassic (muriate of potash (MOP) fertilizers.
 - **Secondary Fertilizers:** These types of fertilizers include Calcium, Magnesium and Sulphur.

Distribution:

1. **Gujarat and Maharashtra:** Important centers are Vadodara, Kalol, Ahmedabad, Kandla and Trombay



2. **Chotanagpur Plateau region:** Jamshedpur, Rourkela, Durgapur, Burnpur, Sindri, Bhilai, etc, Bhilai, Vizag
3. **Tamil Nadu Region:** Coimbatore, Neyveli, Alwaye (Kerala), Kochi (Kerala), Tuticorin, Ennore.
4. **Uttar Pradesh region:** Jagdishpur, Gorakhpur, Aonla, Shahjahanpur, Babrala etc.
5. **North west region:** Bhatinda, Nangal (Punjab), Panipat (Haryana) and Delhi.

Challenges:

- Irrigation facilities are less expanding, which results in less consumption of fertilizer, which leads to lower demand generation and further impacts the growth of industry.
- Old technology: Major of the fertilizer industries operate under PSUs, which are using old technologies and making huge losses.
- Changing govt policies: Previously the Government provided huge subsidies, but now with bigger involvement of institutions like WTO, Govt is now forced to lower the amount of subsidies it is providing to the farmers.
- Raw material availability: Availability and fluctuating prices of raw materials required to produce fertilizers creates a major problem in the fertilizer industry.

Government Initiative:

- Neem Coating of Urea: Department of Fertilizers (DoF) has made it mandatory for all the domestic producers to produce 100% urea as Neem Coated Urea (NCU).
- New Urea Policy (NUP) 2015: The new policy aims to maximize indigenous urea production.
- New Investment Policy- 2012: It aims on Promotion of City Compost. The Government has approved a policy on promotion of City Compost by granting Market Development Assistance of Rs. 1500/- for scaling up production and consumption.
- The Nutrient Based Subsidy (NBS) Scheme: Through this scheme, a fixed amount of subsidy is decided on an annual basis.

Pharmaceutical Industry

India is regarded as the pharmaceutical capital of the world. The industry is one of the oldest industries in India. India's pharmaceutical industry flourished post-independence. Before independence India relied on imports. The production of drugs and pharmaceuticals in India for its own bulk is self-sustaining. India is one of the major exporters of pharmaceuticals and drugs to third-world countries. The industry is one of the most organized industries in India.

With the educated and skilled manpower, low manufacturing costs coupled with cheap labor the pharmaceutical industry is best suited to flourish in India. The local manufacturers take 75 percent of the burden of manufacturing the drugs in India. The highest selling drugs in India are antibiotics.

Geographical distribution of the Pharmaceutical Industry in India:

60 percent of the pharmaceutical production in India is produced in Mumbai, Ahmedabad, and the Pune region. Apart from these regions, Kolkata, Chennai, Coimbatore,



Fertiliser Industries in India

Bangalore, Hyderabad, Delhi, Indore, and Gwalior are major producers of pharmaceuticals and drugs.

African countries are the major markets for India's generic drugs. Hence, most of the industries are concentrated near the ports of western India to reduce the transportation cost.

The easy availability of capital, raw materials, cheap labor, and infrastructure has boosted the industry in particular.

Challenges faced by Pharmaceutical Industry:

- India is dependent on China for raw materials. These raw materials are otherwise known as API or Active Pharmaceutical Ingredients. Around 70 percent of the bulk of the total drug is imported from China.
- The research and development in the pharmaceutical industry are very low in India.
- The problem of adulteration, piracy, and duplication of drugs has tarnished the image of India's pharmaceutical sector.
- India has frequently been accused of violating intellectual property rights and the TRIPS agreement. For this India is kept on the priority watch list in its special 30 reports by the USA. This hurts the pharmaceutical companies of India.

Significance of Pharmaceutical Industry:

The domestic market of India is large and the bulk of production goes into consumption. India also has the lowest production cost in the world when it comes to the pharmaceutical industry. The huge demand for life-saving drugs both globally and locally gives an opportunity to become a global leader in the pharmaceutical and drug manufacturing front.

Government initiatives:

- Scheme for Strengthening of Pharmaceuticals Industry (SPI)
- Production Linked Incentive (PLI) scheme for Pharmaceuticals
- Production Linked Incentive (PLI) Scheme for Promotion of Domestic Manufacturing of Critical Key Starting Materials (KSMs)/Drug Intermediates and Active Pharmaceutical Ingredients (APIs) in the Country.
- Production Linked Incentive (PLI) Scheme for Promoting Domestic Manufacturing of Medical Devices.
- Scheme for Promotion of Bulk Drug Parks.

Glass Industry

Indians are known to have acquired the knowledge of glass making since time immemorial. Glass making came into being in the 16th century with items like bangles, flasks, and small bottles were made. Since the 17th century enameled glass was made in areas like Uttar Pradesh and Karnataka.

Do You KNOW?

Modern glass making started from 1932. The first successful glass industry was established in 1942. The glass industry undertook a large-scale modernisation after independence.

Locational factors:

- Glass industry requires a large number of raw materials.
- The most important raw material is Silica, sand which constitutes 75% the basic material.
- It is a bulky material and can not bear the cost of heavy transportation.
- Therefore the location of silica sand influences the glass industry.
- The other raw materials used are limestone, manganese, dolomite, feldspar, soda ash, barium oxide, sulphur and copper.
- These raw materials impact the glass industry upto certain extent.
- All other materials except soda ash are abundantly available in the country.
- Sufficient supply of coal at cheap rates also influences the industry.
- Glass is a fragile commodity and easily breaks down during transit. Therefore the industry needs to be situated near the market.

Distribution:

Uttar Pradesh, West Bengal, Maharashtra and Tamil Nadu are the main glass producing states and contribute the bulk of production.

Uttar Pradesh:

Firozabad in Agra district is the largest producer having as many as 100 small factories. The other major centers of glass production are Bahjoi, Naini, Hiranagau, Shikohabad, Hathras, Sasni, Allahabad and Jaunpur.

Uttar Pradesh has the advantage of locally available raw materials and a ready market for glass and glass products.

Skilled glass workers known as shisgars of Firozabad have been engaged in the process of glass making for several generations and provide cheap and skilled labour for this purpose. Only coal has to be transported from Jharkhand and West Bengal.

West Bengal:

The state has 34 factories located at different places like Kolkata, Haora, Raniganj, Belgachiya, Belgharia, Belur, Sitarampur, Rishra, Durgapur and Asansol. Pure sand of high quality is available from the white Damudas sandstones at Mangalhat and Patharghata. Sand is also obtained from Bargarh and Lohagra near Allahabad. Good quality coal is obtained from the nearby coalfields at Jharia and Raniganj. Good market is readily available in the Hugli industrial region.

Maharashtra:

The state has 22 factories. Main centres of glass industry are Mumbai, Talegaon (Pune), Satara, Nagpur and Kolhapur. The industry specializes in bottles, shells, flasks, lampware, beakers and sheet glass.

Other areas of production:

The other producers are Gujarat (Bharuch, Vadodara, Morvi and Panchmahal), Tamil Nadu (Salem, Chennai, Coimbatore), Bihar (Kandra, Bhawaninagar, Patna), Jharkhand (Jamshedpur, Kahalgaon), Rajasthan (Dhaulpur and Jaipur), Haryana (Ambala and Faridabad), Andhra Pradesh (Warrangal and Hyderabad), Delhi (Shahdara), Punjab (Amritsar), Kerala (Alwaye), Orissa (Barang, Cuttack), Madhya Pradesh (Jabalpur, Gondia), Assam (Guwahati) and Karnataka (Bangalore).

Challenges:

- **Rising Input Cost:** Input costs are getting high because of the Raw materials There are mining issues across states like the Govt delaying mining leases.
- **Increased Finished goods inventories:** Lack of demand has led to the increase in Finished good inventories.
- **Import of glass:** Float glass is imported from the Middle east, while container glass is imported from China.
- **Alternative packaging:** Plastics and us of Tetra packs have come in more use than the use of glass box packaging
- **Limited sectoral usage:** Companies need to diversify the use of glasses in more sectors. Glass production

is majorly linked to two fields. One is Construction and the other is Alcohol.

Government Initiatives:

- Government of Uttar Pradesh is implementing a number of schemes for encouragement of glass industries as it is the largest manufacturer of glass:
 - ◆ Uttar Pradesh Export Infrastructure Development Scheme
 - ◆ Marketing Development Assistance to Exporters
 - ◆ Subsidy on freight charges up to gateway port
- Under the One District, One Product (ODOP) Scheme, assistance is provided for participation in National and International fairs.
- Under ODOP Scheme, loans are provided for establishment and expansion of glass units.
- 40% benefits are reserved for the glass industry under U.P. Government Swarojgar Yojna.
- Under the ODOP Scheme, trainings are being provided to artisans and handicrafts men related to glass industries along with toolkits

Ceramic Industry

Ceramic objects are made by combining naturally occurring raw materials, such as clay, earthen minerals, and water, and shaping them into forms using handbuilding, wheel-throwing, or mold casting techniques. Once shaped, the object is fired in a kiln at a high temperature. Firing ceramics make them hardened and heat resistant. Ceramic objects are used as building materials, functional dinnerware, decorative sculpture, and more. Ceramics also known as fire clay is an inorganic, non-metallic solid article, which is produced by the art or technique of heat and subsequent cooling. Ceramics is a diverse industry and contains several categories of products, including sanitary ware, cement, advanced ceramics and ceramic tiles. Ceramic products like crockery, sanitary ware, tiles etc play a very important role in our daily life. This is because, apart from their decorative look, ceramic products are primarily hygiene products. This is also one of the chief reasons for their wide usage in bathrooms and kitchens in modern households to medical centers, laboratories, milk booths, schools, public conveniences etc. The ceramic industry has a long history, with the first instance of functional pottery vessels being used for storing water and food, being thought to be around since 9,000 or 10,000 BC. Clay bricks were also made around the same time. The ceramic industry has been modernising continuously, by newer innovations in product design, quality etc.

Indian ceramic industry, which is presently the **third largest** producer in the world.

Distribution:

The beginning of the modern ceramics industry is associated with the discovery of deposits of China clay in rajmahal hills of Jharkhand. Further discoveries of China clay in different parts of countries led to the rise of ceramic industries in states like West Bengal, Orissa, Madhya pradesh, Maharashtra, Karnataka, Kerala.

At present there are above 150 units in the organised sector manufacturing different items. The important industrial centers are Kolkata, Delhi, Mumbai, Bengaluru, Gwalior, Thanagad, Ranikhet, Jaipur.

Challenges:

- On the import duties front, while the tariffs on ceramic tiles is 10%, the inputs used in the production process attract a customs duty of 5%, 7.5% and 10%
- Tiles from china are routed through SAARC countries to evade the anti dumping duty
- Problem is intensified by China's entry in the Bangkok agreement, because of which Chinese goods will attract only 10% duty against the current 15%.
- Another major problem is Rising fuel costs of manufacturing due to increase in prices of LPG and raw materials such as zirconium and titanium.
- On the other hand, because of the price war from China, domestic tile manufacturers cannot increase their price. This directly reduces their sales and profitability further.

Government initiatives:

- Lowered Goods and Service Tax is expected to narrow down pricing gap between organized and unorganized players; Anti-dumping duty levied on ceramic tableware imported from China for 5 years.
- The Indian government has launched various schemes such as Micro and Small Enterprises Cluster Development Programme and INDUSTRIAL INFRASTRUCTURE UPGRADATION SCHEME for cluster development, Credit Linked Capital Subsidy scheme and National Manufacturing Competitiveness Programme for technology upgradation while Market Access Initiative for promoting exports of Small Scale Industry clusters.
- Initiatives to improve energy efficiency of Indian ceramic clusters have been undertaken by global organizations such as United Nations Industrial Development Organization and GEF as well as

national organizations such as Bureau of Energy Efficiency and The Energy and Resources Institute.

- Initiatives for cluster modernization and restructuring has been undertaken by global organization The United Nations Industrial Development Organization as well as government authorities – The Ministry of Micro, Small and Medium Enterprises, and Tamil Nadu SIDCO

Cottage Industries

The cottage industry are small and mostly family-run enterprises where the profits are majorly used to meet the daily needs of the households. This is the reason why it is also known as a small-scale industry.

India has one of the widest and oldest penetrations of cottage industries globally.

The country's diversity is also reflected in the dynamic and wide-ranging products that the industry churns out into the market. The term "cottage industry" is associated with manufacturing units that make their products mainly by hand. India is often praised and is well known for its diverse culture, handicrafts from its traditional cottage industries, variety of food items, etc.

Distribution of major cottage industries:

The major cottage industries in India are cotton weaving, carpet making, silk weaving, leather industry, metal handicrafts, and small food processing industry.

Cotton weaving: The cotton industry is majorly concentrated in Maharashtra, Tamil Nadu, and Gujarat.

Silk weaving: The major silk production is in Karnataka and holds about 70% of the total silk weaving industries. Mulberry, Tassore, Muga, and Eri are the types of silk produced within our country.

Carpet making: The carpet-making industry is divided throughout the country mainly found in Kashmir, Rajasthan, Punjab, Uttar Pradesh, Andhra Pradesh, and Punjab.

Leather works: The regions of India producing leather are Tamil Nadu, West Bengal, and Uttar Pradesh.

Challenges:

The following issues are generally faced by the Indian Cottage Industry;

- The middlemen offer low prices to the manufacturer but take heavy chunk of money from the buyers
- The handloom weavers face heavy competition from the power looms industries

- There is a need to implement techniques that develop skills of the laborers and meet the requirements of the local market
- Government do not provide subsidies to these producers in an adequate amount
- Raw materials are limited, i.e. they are either available in specific seasons only or they are resources which decreases with time
- Easy and cheap finances are not available to these industries
- Generally, these industries are located in rural areas, they lack in implementing various marketing strategies, etc.

Govt initiatives:

- The Union Government has established a variety of agencies to assist small businesses and villages. The Khadi and Village Industries Commission, the All India Handicrafts Board, the AH India-Handloom Board, and the Central Silk Board are among them.
- The small-scale sector is a priority sector for the provision of institutional credit. Therefore these industries have access to credit through a variety of institutions.
- Industrial estates and rural industrial projects have been established, as well as industrial co-operatives.
- At the district level, District Industries Centers are being developed to provide all of the services and support that small and village enterprises require under one roof.

Electronics Industry

The electronics sector produces electronic equipment and consumer electronics and manufactures electrical components for a variety of products. Common items in the electronics sector include mobile devices, televisions, and circuit boards. Industries within the electronics sector include telecommunications, networking, electronic components, industrial electronics, and consumer electronics.

Electronics manufacturing had grown from USD37.1 billion in 2015-16 to USD67.3 billion in 2020-21.

Distribution:

- Maharashtra
- Tamil Nadu
- Gujarat
- Telangana

- Andhra Pradesh
- Karnataka
- Uttar Pradesh

Challenges in India:

- **No incubation:** In India, there are no fabrication units. more than 90% of global companies already have their R&D and design centers for semiconductors but never established their fabrication units.
- **Strategic sector:** Although India has semiconductor fabrication units in Mohali and Bangalore, they are purely strategic for defense and space applications only and not for other sectors.
- **Capital requirement:** Setting up fabrication units is capital intensive and needs investment in the range of \$5 billion to \$10 billion.
- **Lack of supportive policies:** Lack of investments and supportive government policies are some of the challenges to setting up fabrication units in India.
- **Geopolitical limitations:** A combination of capital and the geopolitical situation comes into play to build new fabrication units.

Government initiative:

- The Union Budget 2020-21 allocates the US \$ 920 million to the Ministry of Electronics and Information Technology (MeitY). In the allocated budget, revenue expenditure allocation is US \$ 870 million and capital expenditure allocation is US \$ 50 million.
- In October 2020, the government approved applications from 16 electronics companies, including 10 mobile phone manufacturers, for a reward under the product-linked incentive scheme, with a total disbursement of Rs 40,000 crore.
- To support the ESDM sector and its development trajectory, the Government of India has made electronics production an important pillar of important initiatives like Make in India, Digital India, and Start-up India.
- The Government of India has allowed 100% Foreign Direct Investment (FDI) under the automatic route in the ESDM sector. In the case of electronics goods for defense, up to 49%, FDI is permitted under the automatic route. And more than 49% of FDI requires government approval.
- In line with the 'Skill India' campaign, the Department of Electronics and Information Technology (DeitY) launched an initiative for capacity building in ESDM.
- The Scheme for Promotion of Manufacturing of

Electronic Components and Semiconductors (SPECS). The scheme will provide a financial incentive of 25% on capital expenditure for the identified list of electronic goods.

- Government has invited applications from startups, 100 domestic companies, and small and medium enterprises to become a part of the design-linked incentive (DLI) scheme.

DLI scheme:

- The scheme aims to provide financial and infrastructural support to companies for setting up fabrication units or semiconductor making plants in India.
- The aim of the scheme is to attract existing and global players as it will support their expenditures related to design software, IP rights, development, testing, and deployment.
- Center for Development of Advanced Computing (CDAC) will serve as the nodal agency for the implementation of the DLI scheme.

Challenges:

- Avoiding importing solar modules
- Creating demand for domestic solar modules
- Extending the existing RPOs to captive consumers.

(Renewable Purchase Obligation (RPO) is a mechanism by which the State Electricity Regulatory Commissions oblige entities to purchase a certain percentage of power from renewable energy sources)

- Implementing and monitoring use of feed-in-tariff processes
- Checking if the mandated industries/utilities are using or installing solar solutions or not
- Increasing awareness of solar technologies
- Delay in new manufacturing policy implementation
- The huge discount in tariffs
- Developing an easy certification process to establish high growth rate
- Solar skill development to harness solar potential by increasing domestic capacity and awareness.

There are also challenges like- delays in land acquisition, lack of uniform policy and implementation issues, low investment in R&D, and many more that need to be addressed.

Government Initiatives:

Below are top government programme initiatives taken by the government in the solar sector to push more and more individuals and companies globally to go solar and 100% renewable:

1. The government plans to create an additional domestic solar equipment manufacturing capacity of 25 gigawatts (GW) each of solar cells and modules, and 10GW of wafers by April 2023.
2. a large manufacturing zone each in a coastal state, a mountain state and a landlocked state are being set up to produce power and renewable energy equipment.
3. The National Solar Mission requires bidders to use solar photovoltaic (PV) modules manufactured domestically in the first-ever solar tenders of 150 megawatt and 350 MW.
4. In 2012, the Modified Special Incentive Package Scheme was launched to provide financial aid via subsidy grants to local players.
5. The Indian government introduced certain measures such as the Domestic Content Requirement and the safeguard duty to dampen the influx of cheap

Solar Manufacturing

What is Solar Manufacturing?

Solar manufacturing refers to the fabrication and assembly of materials across the solar value chain, the most obvious being solar photovoltaic (PV) panels, which include many subcomponents like wafers, cells, glass, backsheets, and frames. Aside from panels, there are many different manufactured products that are required for solar energy systems, including inverters, wiring, combiner boxes, and racking and tracking structures.

Distribution:

- **Mundra, Gujarat:** Adani Groups Solar PV manufacturing unit
- **Gurugram, Haryana:** Vikram solar limited, (Solar PV Module manufacturer)
- **Surat and Umbergaon in Gujarat:** WAAREE ENERGIES LTD, (Solar PV Module manufacturer)
- **Hyderabad and Bangalore in Karnataka :** RENEWSYS SOLAR (Encapsulants (EVA & POE), Backsheets and Solar PV Cells.)
- **Bangalore, Karnataka:** SWELECT Energy Systems Limited (Solar PV Module manufacturer)
- **Dabaspet, Karnataka:** EMMVEE SOLAR SYSTEM (Produces water tank)

- imports
6. Basic Customs Duty from 2022 is imposed on solar manufacturing goods imported from foreign countries.
 7. M-SIPS Scheme of Ministry of Electronics & Information Technology:
 - The scheme mainly provides for:
 - 20-25% subsidy for investments in capital expenditure for setting up of electronic manufacturing facility.
 - Reimbursement of Countervailing Duty (CVD)/ Excise Duty for capital equipment for the units outside Special Economic Zone (SEZ).

Major Industrial Regions in India

The concentration of Industries in any region is based on the geo-economic backgrounds. On the basis of location there are eight major industrial regions in India, viz. Mumbai-Pune belt, Hooghly belt, Ahmedabad vadodara belt, Bengaluru-Tamilnadu belt, Kollam-Thiruvananthapuram belt Chota- Nagpur plateau region, Gurugram- Delhi, meerut belt, Visakhapatnam Guntur belt.

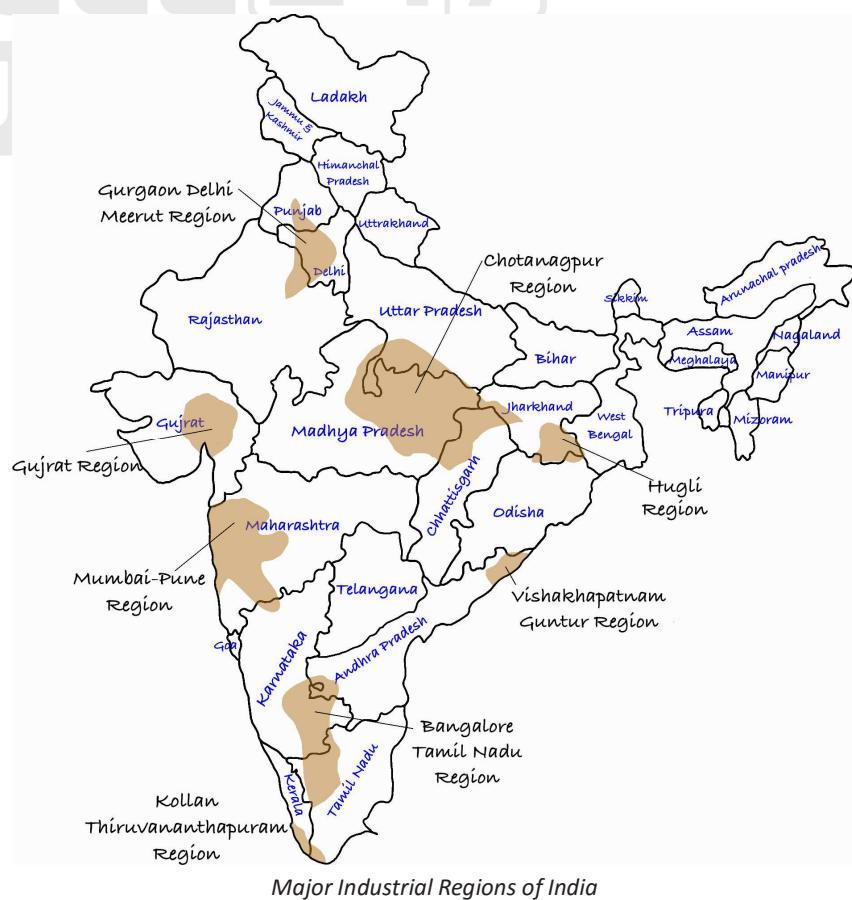
Gurgaon Delhi Meerut Region:

- **Location:** 2 belts stretches over this region
 - ◆ Agra- Mathura -Meerut, and Saharanpur.
 - ◆ Faridabad-Gurgaon, and Ambala in Haryana.
- **Product:** Textile, sugar, glass, chemicals, engineering, paper, electronics, cycle, agricultural implements, etc are some of the important industries of this region.
- **Reasons for development:** The region is situated in the most productive part of the country, providing crucial raw materials for agro-based industries. The nearness of Indira Gandhi International Airport and hydroelectricity from the Bhakra-Nangal complex and thermal power from Harduagani, Faridabad, and Panipat. Faridabad has a number of engineering and

electronic industries; Ghaziabad is a famous large center of agro-industries. The software industry is a recent addition to Agra. Whereas, Mathura is an oil refinery that contributed to the growth of the region.

Gujarat Region:

- **Location:** The region is located between Ahmedabad and Vadodara. It extends up to Valsad and Surat in the south and Jamnagar in the west.
- **Products:** Textiles are an important product of this region. Besides Textiles (cotton, silk, and synthetic fibers) other industries are heavy and basic chemicals, dairy products, engineering, pesticides, diesel engines, and food processing. The region is the second-largest cotton textile industrial base in India. Vadodara is known as an important center of woolen textile and petrochemical goods, on the other hand, Surat is known for silk textiles and diamond cutting.
- **Reasons for development:** It is one of the largest industrial regions in the country. The main reasons for the growth of this region are the availability of labor, port facilities, closeness of petroleum, hydel, thermal, and nuclear power stations. Petrochemical



industries developed around the region such as Ankleshwaraeshwar, Vadodara, and Jamnagar due to the production of oil in the Gulf of Khambhat area. Moreover, this region is situated close to the Kakrapara nuclear power station, Ukai Hydel Project, and Dhuvaran thermal power station.

Chotanagpur region:

- **Location:** This region is stretched over Jharkhand, Northern Orissa, and the Western part of West Bengal.
- **Product:** Heavy engineering, locomotives, and heavy electrical and machine tools are important industries in this region. The region is also rich in fossil fuel, and metallic and non-metallic minerals. Iron ore is also found in the regions of the Jharkhand and Odisha belt.
- **Reasons for development:** The growth of this region is related to the discovery of coal in Damodar Valley and iron ore in the Jharkhand-Orissa mineral belt. The region is often called the 'Ruhr of India' because of the large steel and iron industries concentration. Power availability from Damodar Valley Corporation and the supply of cheap labor contributed to the development of this region to a large extent. The Kolkata region provides port facilities and a large market for this region's goods. The region is also having the advantage of developing metal industries. For example, The Tata Iron and Steel Company at Jamshedpur, Indian Iron Steel Co., at Bumper-Kulti, Hindustan Steel Limited at Durgapur, Rourkela, and Bokaro are the important steel plants located in this region.

Hugli region:

- **Location:** This region is located in West Bengal and stretches along the river Hugli covering around 100 km from Bansbaria and Naihati in the north to Birlanagar in the south.
- **Product:** The major industries of this region include textile machinery, chemical, pharmaceuticals, fertilizers, paper, engineering, petrochemical industries, etc. Hindustan Motors Limited at Konanagar and the diesel engine factory at Chittaranjan are major landmarks of this region.
- **Reasons for Development:** The river Hugli provides a site for developing an inland river port for the development of industrial regions. It is linked by the Ganga River and its tributaries. Besides navigable rivers, roads, and the railways provided subsequent

links to the great benefit of Kolkata port. The discovery of iron ore on the Chotanagpur plateau, and tea plantations in Assam and northern parts of West Bengal led to the industrial development of this region. The petroleum refinery at Haldia has facilitated the development of this region.

Mumbai Pune Region:

- **Location:** The region is spread from Thane to Pune and its adjoining districts of Nashik and Solapur. The industries have also grown at a rapid pace in Kolaba, Ahmednagar, Satara, Sangli, and Jalgaon districts also.
- **Product:** cotton textile and chemical industries, engineering goods, leather, oil refineries; petrochemicals, synthetic and plastic goods, chemicals, drugs, fertilizers, electricals, electronics, software, ship-building, transport, and food industries have also developed here.
- **Reasons for development:** The growth of this industrial region is related to the growth of the cotton textile industry in the country. Cotton was cultivated in the areas of the Narmada and Tapi basin. Availability of port facilities for export-import, and availability of cheap labour force led to the development of this region and made Mumbai the "cottonopolis of India". The opening of Mumbai High petroleum field and nuclear energy plants contributed to the development of this region.

Vishakhapatnam Guntur region:

- **Located:** The region stretches from the north-eastern part of Andhra Pradesh to Kurnool and Prakasam districts in the south-east and covers most of coastal Andhra Pradesh.
- **Product:** Some of the important industrial areas of this region include fertilizers, cement, aluminium, light engineering, sugar, paper, and textiles.
- **Reasons for development:** The industrial development of this region is dependent upon Visakhapatnam and Machilipatnam Port. Rich mineral resources and developed agriculture of these ports provide an important base for the industrial development of this region. The Coal Fields of the Godavari basin is an important source of energy for the region. Hindustan Shipyard Ltd is the main focus petroleum refinery at Visakhapatnam which facilitates the growth of petrochemical industries in this region. Visakhapatnam is the only plant of steel and iron industries located on coastal locations in

India. Krishna-Godavari basin will fulfill the energy demand of the region. It also uses high-quality iron from the Bailadila region of Chhattisgarh.

Kollam-Thiruvananthapuram region:

- **Location:** The region is spread over the Thiruvananthapuram, Kollam, Alwaye, Emakulam, and Alappuzha districts of south Kerala.
- **Product:** The region is dominated by agricultural products processing and market-oriented light industries. The reason for this is that it is far away from the mineral belt of the country. The main industries are textiles, sugar, rubber, glass, chemical fertilizers, food and fish processing, paper, coconut coir products, aluminum, and cement.
- **Reasons for development:** Plantation agriculture and hydroelectricity provide the industrial base for this region. The oil refinery set up in 1966 at Kochi provides a solid base for petrochemical industries. Important industrial centres are Kollam, Thiruvananthapuram, Aluva, Kochi, Alappuzha, and Punalur.

Bangalore Tamil Nadu region:

- **Location:** The region is spread between the states of Karnataka and Tamil Nadu. In this region, till 1960, industries were confined to the Bangalore district of Karnataka and Salem and Madurai district of Tamil Nadu. Now they have covered all the districts of Tamil Nadu except Viluppuram.
- **Product:** The region is mostly dominated by cotton-textile industries. It has a large number of silk-manufacturing units, sugar mills, leather industry, chemicals, diesel engines and radio light engineering goods, rubber goods, medicines, cement, and machine tools.
- **Reasons for development:** Cheap skilled labour and proximity to large local markets as well as a good climate have favored the concentration of industries in this region. Coimbatore has grown rapidly mainly owing to its industrial growth based on Pykara power, local coffee mills, oil presses, and cement works. Coimbatore is known as Manchester of TamilNadu because of its large-scale cotton textiles industries. The establishment of public sector units in Bangalore like Hindustan Aeronautics, Hindustan Machine Tools, Indian Telephone Industry and Bharat Electronics, etc. has further pushed up the growth of industries in the region.

Service Sector of India

The service sector is the largest sector of the global economy accounting for over 70 percent of the global GDP. It includes a variety of intangible goods. The service sector jobs can range from service industries, warehousing, transportation services, information services, securities, professional services, and healthcare to arts, entertainment, and recreation. While the individuals employed in the manufacturing sector produce tangible goods like cars, clothes or equipment and etc.

The Service Sector in India

The service sector is the **largest and fastest-growing sector** in India. India features among the **top ten World Trade Organisation (WTO) members in service exports and imports**. Over the years it has not only become the dominant sector in India's GDP (Gross Domestic Product) share but has also attracted significant foreign investment and provided large-scale employment.

- The Economic Survey of India highlights that the service sector of India **accounts for 53 percent of GVA (Gross Value Added)** for the financial year 2022.
- The sector has the **highest share of labor productivity in India**. Employment in services as a percentage of total employment in India was reported at around 32 percent in 2020. However, the service sector could not keep pace with the share of contribution to the GDP with the proportion of employment generated.
- India has a significant footprint in the service sector exports. Around 40 percent of the total exports are contributed by the service sector in India. It is estimated that the service sector exports of India are likely to touch one trillion dollars by 2027, three years before the target.

The service sector of India ranges from transportation, education, tourism, finances, and information technology & business process management (IT-BPM). The country remained in the top ten trading countries in commercial services. Compared to the manufacturing sector in India, the service sector is more dynamic and accounts for 55 percent of the total size of the economy. The growth of the manufacturing sector remains stunted with respect to the service sector.

Reasons compelling India to shift from the primary sector to the service sector while leap-frogging the secondary sector:

There is a natural economic movement in every country from the agrarian economy to the industrial economy to the service economy. However, India leapfrogged from an agrarian economy to a service economy due to remarkable development in the service sector. Software and IT-enabled services stood as the flag-bearers for India's exports for the last 20 years. It has made IT a significant service exporter with its share in world services exports rising from 0.6 percent in 1990 to 3.3 percent in 2013. The availability of cheap labor, a large English-speaking population, and educated human resources are some of the major reasons for the growth of the service sector in the country.

On the other hand, low growth in the secondary sector could be attributed to, restrictions in foreign investment, license raj, stringent labor laws, lack of skilled labor, power deficit, no measures taken to promote private industry, delays in land acquisitions, and environmental clearances, import of cheap manufactured goods etc. While India ranks low in terms of per capita income, its share of services in GDP is touching the global average.

Manufacturing is a labor-intensive sector, growth in this sector will create more employment opportunities. More employment opportunities provide a boost to per capita income by employing a higher number of people. The government of India has launched "**Make in India**" to renew the emphasis on the manufacturing sector and raise employment in proportion to the growth in the GDP.

Jurisdiction in the service sector

- **Union list:** Telecommunications, postal, broadcasting, financial services, banking, national highways, mining services.
- **State list:** Health care, real estate services, hunting, retail, services incidental to agriculture, and forestry.
- **Concurrent list:** Professional services, printing, education, and electricity.

Tourism Sector

Tourism in India was prioritized to a large extent since ancient times. Kings like Ashoka, and Sher Shah

Suri built roads and restrooms for the pilgrims. Chinese travelers like Hieun-Tsang traveled to India extensively during medieval periods. India attracted travelers from Europe, the Middle East, etc. The importance of tourism has been pointed out in the Arthashastra.

Tourism in India has been established and flourished since ancient times. The tourism sector started to take a keen interest in India in the late 1980s during the seventh five-year plan. India being a tropical country with a vast diversity both in culture and geography provides a unique blend of experiences to the travelers. The vast stretches of coastline beaches, snow-covered mountains in the Himalayas, plateaus in peninsular India, evergreen forests of Western and Eastern Ghats, and Islands leave no stone unturned to mesmerize a traveler.

The tourism sector may not only refer to a recreational activity. A tourist may visit a country for various reasons and accordingly they are classified. The tourism sector in India is further classified as Adventure Tourism, Pilgrimage Tourism, Wildlife Tourism, Heritage Tourism, Nature Tourism, Medical Tourism, Educational Tourist, Sport and recreation tourist, Eco-Tourism, Business Tourism, etc.

Significance of Tourism in India

The tourism sector in India is one of the fastest-growing and biggest industries in terms of economic advantages and socio-economic development in the country. The tourism sector contributes around 5 percent to the country's GDP and 13 percent of the total employment. India ranks 23rd in the world in terms of international tourist arrivals. The tourism sector helps to generate foreign exchange earnings. The higher the tourist footfall, the higher the foreign exchange earnings. India ranks 12th in terms of foreign exchange earnings from the tourism sector.

- **Employment opportunities:** The economic growth of the country is strengthened by new employment opportunities. It is found that one out of ten jobs created in India is from the tourism sector. In the year 2017, the tourism industry accounted for 8% of the total employment.
- **Multiplier effect:** The tourism sector in India has a multiplier effect that significantly helps in the redistribution of income and thereby reducing poverty. The tourism sector boosts the service sector. For example, the airlines, hotels, and transportation experience growth with the simultaneous growth of the tourism sector.

- **Boosts forex reserves:** The tourism sector also boosts the foreign exchange reserves of the nation. The foreign exchange earnings from tourism in India registered a growth of around 12 percent in the year 2018 as compared to 2017.
- **Preservation of national heritage:** With rising in the tourism industry the national heritage and the environment is given more importance. The sites and monuments are preserved as well as the importance of preserving these ancient heritages is felt among the masses. As of the year 2022, there are 40 World Heritage Sites located in India. 32 are cultural heritage, while 7 are natural, and one, the Khangchendzonga National Park, is of mixed type. India has the sixth-largest number of sites in the world.
- **Cultural pride:** The Travel and Tourism Competitiveness Report 2019 ranked India 35th out of 140 countries. India improved its ranking by 6 places over the 2017 report. Apart from the contribution to the national GDP by the tourism sector, instills a sense of pride, and puts India on the global map of tourism. Tourism plays a significant role in cultural exchange among various countries across the world.
- **Soft power:** Tourism forms the base of **soft power** and **cultural diplomacy** on the geopolitical front. The people-to-people connection among various countries promotes friendship and helps in prevailing lasting peace in the regions.

Medical Tourism

As the name suggests, medical tourism refers to traveling outside the resident country for the reason of receiving medical care. The recent growth of demand for medical tourism has drawn the attention of policymakers and researchers. India is considered one of the most sought-after medical care destinations in the world. It has emerged as a lucrative destination for orthopedics, transplantation of organs, cardiology, ophthalmology, curative care, prevention, and alternative medical care. With the diversity of alternatives like **Allopathy, Ayurveda, Yoga, Unani, Siddha, and Homeopathy** a patient can refer to any of the preventive and curative medical care in India. With a potential 9 billion dollar market, India can capture 20 percent of the global market share.

Factors making India a lucrative destination for Medical tourism:

Patients from Bangladesh, Afghanistan, Maldives, and African countries visit India for medical treatment regularly.

- Widely English spoken language.
- The close proximity to neighboring countries.
- Reasonable medical expenses.
- Higher success rates in recovery.
- People-to-people connections.

Opportunities:

- The aging population in the countries creates demand for wellness medical care. India can tap the opportunities to attract them.
- There is an increasing demand for alternative cure systems and Yoga with people adapting fast-paced modern lifestyle. India can use its expertise in alternative cure systems to tap the opportunity.
- The covid-19 pandemic has increased the demand for medical care. Patients across the countries will seek medical assistance in India due to post Covid-19 complications. India should be ready to avail the opportunity to attract medical tourists.

Do You KNOW?

How did Kerala emerge as a prime medical tourism destination?

The following factors led Kerala to create a brand for itself in the medical tourism sector:

- The moderate weather prevailing in the state coupled with advanced and specialized hospitals, trained medical staff, and technicians help the medical tourism sector flourish in the state.
- High-quality healthcare is offered by the doctors, nurses, and the supporting staff.
- The state maintains a high standard of hygiene.
- Medical tourism in Kerala is marketed along with Ayurveda and other health packages.
- Medical tourism and holiday tourism have been brought together and sold by tour operators at cheaper rates to the patients to their convenience who can avail the best of both worlds.

Challenges in Medical Tourism in India:

Some **weakness** prevails in the medical tourism sector.

- **The private-government paradox:** The ever-increasing inequality between the private and the government hospitals loses opportunities in catering the services.

- Compromised doctor-patient relationship:** The doctor-patient relationship is compromised due to excessive commercialization.
- Deteriorated post-operative care:** Long follow-ups in procedures have deteriorated the quality of post-operative care.
- Malpractices in hospitals:** Lack of infrastructure coupled with illegal malpractices in some hospitals has painted a dull image of the medical sector in India.
- Insurance:** Overseas medical care is not covered by insurance by foreign countries, thus making medical tourism in India less attractive.

Government Initiatives:

To boost the medical tourism sector the union government has taken steps like:

- Integrating Allopathy, Ayurveda, Yoga, Siddha, and Homeopathy under AYUSH and allocated a separate ministry called the ministry of AYUSH.
- Various portals are launched in the native languages of respective countries to facilitate the visiting patients.
- Medical Visas are made more efficient and the time taken to approve visas has considerably reduced.
- Immigration counters and facilitation desks have been set up at major Indian airports.
- A national strategy for MICE (Meetings, Incentives, Conferences, and Exhibitions) tourism has been drafted for the development of Medical and Wellness Tourism and Rural Tourism.

India provides credible services at a low cost. The skilled doctors and high success recovery rates have attracted a large number of foreign patients each year. Thus, India has become a lucrative destination for medical tourism.

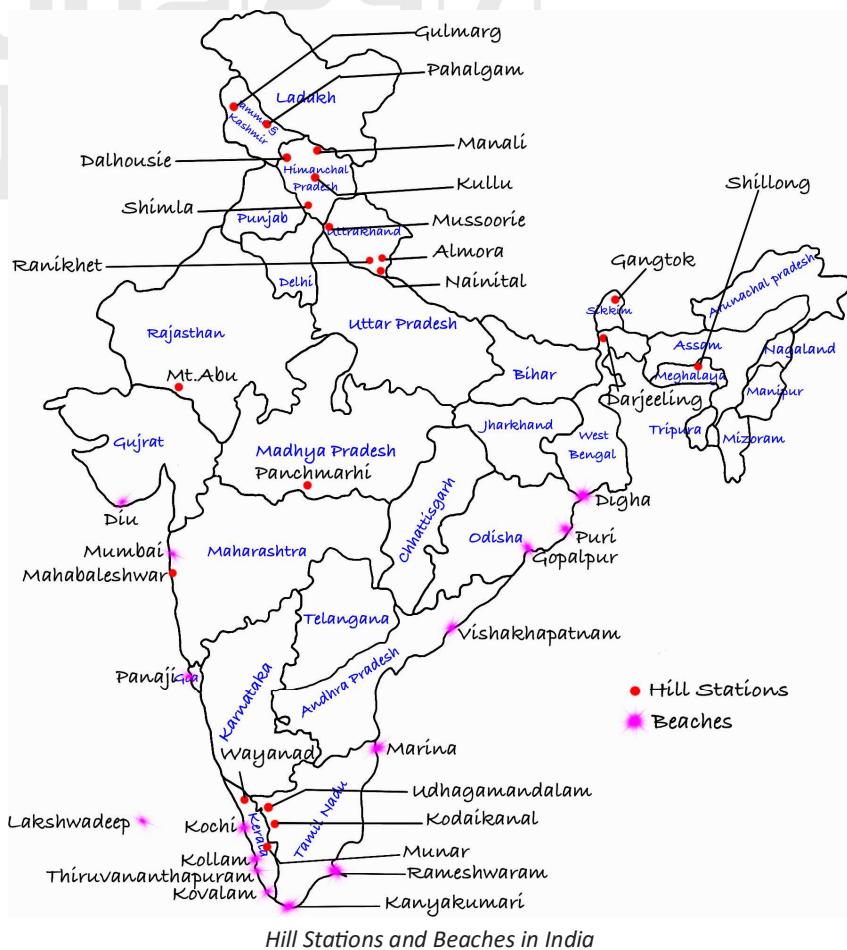
Eco-Tourism

The term **Eco-tourism** first originated in the 1980s with growing

concern for sustainable practices and the conservation of nature. The eco-tourism paved its way in India after the World Tourism Organisation announced 2002 as the International Year of Ecotourism that comes under the United Nations Environmental Programme. Eco-tourism is defined as ecologically sustainable tourism to areas or regions having ecological and biological diversity and is of environmental interest. In India, eco-tourism is famous in the national parks, wildlife sanctuaries etc.

Positive impacts of Ecotourism:

- Boosts economy:** Eco-tourism in India had a positive impact as it boosts the economy of the states.
- Sustainable development:** It promotes sustainable development and awareness among the people of India.
- Employment generation:** It supports employment generation for the locals staying in remote locations and away from urban areas.
- From hunters to preservers:** It motivates the locals to become the guardian of the respective region. For



instance, a village in Nagaland turned from a hunting ground to safe haven for the Amur Falcon.

- **Deters Poaching and hunting:** Promoting eco-tourism indirectly deters poaching.
- **Preservation of indigenous flora and fauna:** The local culture is preserved and indigenous fauna and flora are further encouraged to be conserved.
- **Awareness:** The local community actively participates in protecting and conserving the area.

The negative impact of Ecotourism:

There are some weaknesses that are inherent to some specific sites.

- **Deforestation:** With the rise in eco-tourism, the land around the sanctuaries and forests is cleared. Large deforestation takes place to accommodate resorts and hotels.
- **Commercialization of eco-sensitive regions:** Commercialization of these eco-sensitive regions has further degraded the natural beauty of the region.

Region-specific design and construction of low-impact facilities are required to be promoted. The land rights of the local's and tribes' dwellings have to be well devised. Demarking the sensitive regions coupled with the supervision of both locals and tourists can keep the region pristine and safe.

Challenges in the Tourism Sector of India

Some of the major hurdles faced by tourism sectors are:

Safety and security issues: Lack of safety and security of the travelers, non-acceptance of international cards in India, lack of infrastructure, etc.

Seasonality in tourism: Seasonality in tourism limits the tourism sector in India to flourish to its full potential.

Lack of infrastructure: The absence of basic amenities like washrooms, potable water, and security haunts the sector badly. In 2017, India ranked 114th out of 130 countries in terms of safety and security in a survey conducted by the World Economic Forum (WEF).

Fast-tracking Tourism in India

The contribution of the tourism sector to employment and economic growth is getting more recognition. The Union Government along with the State Government are taking coordinated steps to promote the tourism sector.

Some of the major Government Schemes are:

1. **Swadesh Darshan:** Thematic circuits are built across the country to boost tourism in India. For example, fifteen circuits are built to witness the wonders of India. They are the Buddhist Circuit, Himalayan circuit, Desert circuit, Himachal circuit, Wildlife circuit, Krishna circuit, North-east circuit, Tribal circuit, Coastal circuit, Eco circuit, Tirthankara circuit, Ramayana circuit, Spiritual circuit, Sufi circuit, and Heritage circuit.
2. **PRASAD Scheme:** Promotes sustainability and reconstruction of the monuments and Pilgrimage sites.
3. **Adopt a Heritage program:** Individuals, the private sector, and the public sector are encouraged to



Historical, Archaeological and Religious Centres in India

adopt and subsequently develop a heritage site of their interest.

4. **Azadi ka Amrit Mahotsav:** To celebrate India's 75th year of independence, cultural activities are undertaken at various heritage sites in India.
5. **Incredible India Campaign:** The promotion of the "Incredible India" campaign has received special focus. The objective is to showcase India as a brand in the tourism sector and attract tourists not only to major cities and heritage attractions but also to rural India.

Tourism promotes pluralism and multiculturalism. It has a huge potential when it comes to job creation and soft power. Hence, India is looking for opportunities to strengthen its grip in this sector.

IT and BPM

Information Technology and Business Process Management in short IT-BPM is the subject where people use techniques to analyze, optimize, discover, model, improve and automate the business processes. The combination of any of the methods that are used to manage and develop a company's business processes is called **BPM**. Business Process Management can be supported through modern technologies like **IT, Artificial Intelligence, BlockChain technology** and etc. IT and BPM involve the increasingly technology-aided definition, improvement, and innovation that drives business to deliver results and enable the organization to meet its business objectives. They help in devising business strategies and meeting targets.

Status and Potential

- In 2020-21 the IT and BPM sector's total revenue stood at \$194 bn. The IT-BPM industry stood as the flag-bearer for India's exports for the last 20 years.
- Fintech and the Software & Engineering Services saw a steady growth every year.
- IT-BPM sector in India has huge potential because of its sheer demographic presence and high working population. The IT-BPM industry is the largest private-sector employer that creates more than 4 million jobs. It accounts for more than 45 percent share in total services exported from India.
- India is the second-largest start-up ecosystem in the world.
- The relaxing of FDI policies coupled with a revival in demand for IT services from the US and Europe has further widened the scope of growth in the IT-BPM sector.

Distribution

The major information technology hubs are located in Bangalore, Pune, Hyderabad, Delhi NCR, Chennai, and Kolkata.

Do You KNOW?

Bengaluru emerged as the IT hub in the 1980s and quickly became the leader in the IT industry in India. In the United States, Silicon Valley is the major hub for IT companies. Since Bengaluru is the major hub for IT companies, it became known as the Silicon Valley of India. The term was first used in the 1980s when the push for transforming Bengaluru into an IT hub was made under the leadership of the visionary RK Baliga who came up with the concept of Electronic City. At present, Bengaluru accounts for about 30–40% of the IT exports from India. About 35% of India's pool of 2.5 million IT professionals are working in Bengaluru.

Government initiatives

The government has taken initiatives to broaden the IT and BPM sector by launching various programs and schemes:

1. **Block-chain technology:** The MeitY (Ministry of Electronics and Information Technology) has released the **National Strategy on Block-chain technology** to reduce frauds, speed up enforcement contracts, and increase the transparency of the transactions.
2. **Digital India Programme:** India is the second-fastest digitizing economy globally. The objective of the program is to prepare the country as a knowledge hub with technology central to bringing change.
3. **Start-up program:** The Start-up program targets building a robust ecosystem for Startup culture in India. The objective is to nurture innovation by providing opportunities to entrepreneurs. The Start-up program boosts the Internet of Technology, Machine Learning, Artificial Intelligence, etc.
4. **National optical fiber network:** The program is also known as Bharat Net Project. The objective of the program is to create information superhighways and facilitate broadband connectivity to the Gram Panchayats across the country.
5. **Production Linked Incentive (PLI) Scheme:** The scheme was launched to boost the manufacturing of telecom and networking products in India.
6. **National Broadband Mission:** The **National Broadband Mission** was launched to provide

broadband access to all villages by 2022.

In the year 2020-21 several structural reforms were witnessed. Strict regulations on the IT-BPO sector were removed. In the e-commerce sector, consumer protection regulations were brought in.

Challenges Faced by Service Sector in India

The challenges faced by the service sector in India are

- **Governance in the service sector:** India has a federal governance structure, the jurisdiction of services lies with the central government (Union List), with the state government (State List) and joint administration of central and state governments (Concurrent List). Multiple ministries regulate services such as energy and transport, while, sectors like construction and retail do not have nodal ministries.
 - **Employment:** The capacity of the service sector to generate employment is far less than that of the manufacturing sector. The employment growth has failed to keep a synergy with the income growth or rise in the share of GDP in the service sector. The service sector employs 32 percent of the working population while contributing 53 percent to the GDP.
 - **Demonetization:** The demonetization impacted the service sector badly. There was a deceleration in the services sector as there were execution delays in project completion. The ripples of such hasty policies are still experienced by many enterprises.
 - **Covid-19:** The pandemic brought a significant setback to the service sector especially the tourism sector of India.
 - **Market access barriers:** The market access barriers with India's trading partner countries have affected the service sector. There are Visa issues with major services in different countries for the professionals. For instance, the H1-B Visa issue in the USA. These market access restrictions are required to be negotiated in the WTO meetings.
 - **Domestic regulations:** Domestic regulations and trade restrictions hinder the services sector.

- **Lack of Infrastructure:** The infrastructure of the service sector is weak hence the cost of service delivery is high. Regulations are outdated and the restrictions on the Foreign Direct Investment (FDI) hamper the service sector.

Champion Service Sector Scheme

It is a scheme of the Department of Commerce. The scheme aims at the development of 12 identified Champion Sectors. The sectors included in the scheme are

1. Technology & Information Technology enabled Services (IT& ITeS)
 2. Education Services.
 3. Medical Value Travel
 4. Accounting and Finance Services
 5. Audio Visual Services
 6. Communication Services
 7. Tourism and Hospitality Services
 8. Construction, and Related Engineering Services
 9. Environmental Servic
 10. Financial Servi
 11. Legal Ser
 12. Transport, and Logistics Services



Software Technology Parks in India