MANUFACTURING INDUSTRIES
Industries

Provide employment  Contribute significantly in the total national wealth/income.
- Industries are classified in a number of ways.

Industries are classified in a number of ways. On the basis of size, capital investment and labour force employed, industries are classified as

- Largescale
- Medium scale
- Small scale
- Cottage industries
On the basis of ownership

(i) Public sector
(ii) Private sector
(iii) Joint and cooperative sector
Vijapur Unit 2 as seen from prilling tower
NTPL Thermal Power Plant, Tuticorin, Tamil Nadu
On the basis of the use of their products

(i) Basic goods industries,
(ii) Capital goods industries
(iii) Intermediate goods industries
(iv) Consumer goods industries
On the basis of raw materials

Agriculture based industries
(ii) Forest-based industries
(iii) Mineral-based industries
(iv) Industrially processed raw material based industries
Sugarcane weighing at a Cooperative Sugar Mill in Maharashtra

By Shakher59 - Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=20722622
Based on the nature of the manufactured products

(1) Metallurgical Industries
(2) Mechanical Engineering Industries
(3) Chemical and Allied Industries
(4) Textile Industries
(5) Food Processing Industries
(6) Electricity Generation
(7) Electronics
(8) Communication Industries
Factors influencing the location of industries

Raw Materials
Power
Market
Transport
Labour
Historical Factors
Industrial Policy
Raw Materials

Industries that use weight-losing raw materials are located near their raw materials.

Eg. Sugar industry, pulp industry, copper smelting and pig iron industries.

In iron and steel industries, iron ore and coal both are weight-losing raw materials.

Eg. -near coalfields (Bokaro, Durgapur, etc.)
Power provides the motive force for machines. Certain industries, like aluminium and synthetic nitrogen manufacturing industries, tend to be located near sources of power because they are power intensive and require huge quantum of electricity.
Kudankulam Nuclear Power Plant
Nagarjuna Sagar Dam across Krishna River.
Markets provide the outlets for manufactured products. Heavy machine, machine tools, heavy chemicals are located near the high demand areas as these are market orientated.

Cotton textile industry is generally located in large urban centre, e.g. Mumbai, Ahmedabad, Surat, etc.
Transport

Initially all industries started in Mumbai, Chennai, Delhi and in and around Kolkata. It was due to the fact that they initially became the nodal point having transport links. The industries shifted to interior locations, only when railway lines were laid. All major industrial plants are located on the trunk rail routes.
Labour
Industries require skilled labour.
In India, labour is quite mobile and is available in large numbers due to our large population.
Historical Factors

Greatly influenced by our colonial past.

During the initial phase of colonisation, manufacturing activities received new impetus provided by the European traders.
Industrial Policy

Aims at bringing about economic growth with balanced regional development.

Establishment of iron and steel industry in Bhilai and Rourkela were based on decision to develop backward tribal areas of the country.

At present, government of India provides lots of incentives to industries locating in backward areas.
The Iron and Steel Industry

Basic to the industrial development of any country. The development of the iron and steel industry opened the doors to rapid industrial development in India. Essential raw materials for iron and steel industry are iron ore and coking coal limestone, dolomite, manganese and fire clay.

All these raw materials are gross (weight losing), therefore, the best location for the iron and steel plants is near the source of raw materials. In India, there is a crescent shaped region comprising parts of Chhattisgarh, Northern Odisha, Jharkhand and western West Bengal, which is extremely rich in high grade iron ore, good quality coking coal and other supplementing raw materials.
Locational Factors:

a. Near the coalfields,

b. Near iron-ore mining areas, and

c. At places between coal and iron ore producing areas.
i. Most of the steel plants in India are located in Jharkhand, West Bengal, Orissa and Madhya Pradesh. All these states are rich in coal and iron ore reserves.

ii. The other raw materials needed for making iron and steel are manganese, limestone, dolomite, chromite, silica, scrap iron, etc. These are needed in small quantities and can be transported easily from other places.

iii. The high grade haematite and magnetite ores are available from the mines in Jharkhand, Bihar, Orissa, Madhya Pradesh, Chhattisgarh and Karnataka.

iv. Coking coal for fuel is supplied by the mines in Jharia, Raniganj, Bokaro, Giridih and Korba.

v. The flux-grade limestone can be had from Sundargarh (Orissa), Ranchi (Jharkhand), Durg (Chhattisgarh), Satna (Madhya Pradesh) and Shimoga (Karnataka).
**Integrated Steel Plants**

**TISCO- Tata Iron and Steel plant**

Lies very close to the Mumbai-Kolkata railway line

240 km away from Kolkata-nearest port for the export of steel

The rivers Subarnarekha and Kharkai provide water

The iron ore is obtained from Noamundi and Badam Pahar

Coal is brought from Joda mines in Odisha

Coking coal comes from Jharia and west Bokaro
Tata Steel's Jamshedpur plant at night

By Ashokinder - Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=27311622
IISCO- The Indian Iron and Steel Company

Set up its first factory at Hirapur and later on another at Kulti. 
In 1937 set up another iron and steel producing unit at Burnpur (West Bengal). 
All the three plants located very close to Damodar valley coal fields (Raniganj, Jharia, and Ramgarh). 
Iron ore comes from Singhbhum in Jharkhand. 
Water is obtained from the Barakar River 
Located along the Kolkata-Asansol railway line. 
Unfortunately, steel production from IISCO fell considerably in 1972-73 and the plants were taken over by the government.
IISCO- The Indian Iron and Steel Company
Burnpur (West Bengal)
Visvesvaraiya Iron and Steel Works Ltd. (VISL)

Third integrated steel plant,
Initially called the Mysore Iron and Steel Works
Located close to an iron ore producing area of Kemangundi in the Bababudan hills. Limestone and manganese are also locally available.
But this region has no coal.
Charcoal obtained by burning wood from nearby forests was used as fuel till 1951.
Afterwards, electric furnaces were installed which use hydroelectricity from the Jog Falls hydel power project.
The Bhadravati river supplies water to the plant.
Visvesvaraiya Iron and Steel Works Ltd. (VISL)
Bhadravathi
After independence, during the Second Five Year Plan (1956-61), three new integrated steel plants were set up with foreign collaboration:

Rourkela in Odisha
Bhilai in Chhattisgarh
Durgapur in West Bengal
Rourkela Steel Plant

Set up in 1959 in the Sundargarh district of Odisha in collaboration with Germany.

The plant was located on the basis of proximity to raw materials, thus, minimising the cost of transporting weight losing raw material. Coal is obtained from Jharia (Jharkhand) and iron ore from Sundargarh and Kendujhar.

The Hirakud project supplies power for the electric furnaces. Water is obtained from the Koel and Sankh rivers.
Rourkela Steel Plant
Bhilai Steel Plant

Established with Russian collaboration in Durg Dt of Chhattisgarh and started production in 1959.
The iron ore comes from Dalli-Rajhara mine
Coal comes from Korba and Kargali coal fields.
The water comes from the Tanduladam
Power from the Korba Thermal Power Station.
Lies on the Kolkata-Mumbai railway route.
The bulk of the steel produced goes to the Hindustan Shipyard at Vishakhapatnam
Durgapur Steel Plant

Set up in West Bengal in collaboration with the government of the United Kingdom and started production in 1962. This plant lies in Raniganj and Jharia coal belt and gets iron ore from Noamundi. Lies on the main Kolkata-Delhi railway route. Hydel power and water is obtained from the Damodar Valley Corporation (DVC).
Bokaro Steel Plant

Set up in 1964 at Bokaro with Russian collaboration.
Set up on the principle of transportation cost minimisation by creating Bokaro-Rourkela combine.
It receives iron ore from the Rourkela region and the wagons on return take coal to Rourkela.
Other raw materials come to Bokaro from within a radius of about 350 km.
Water and Hydel power is supplied by the Damodar Valley Corporation.
Bokaro Steel Plant
Other Steel Plants

New steel plants which were set up in the Fourth Plan period are away from the main raw material sources.
All the three plants are located in South India.
The Vizag Steel Plant, in Vishakhapatnam in Andhra Pradesh is the first port based plant which started operating in 1992.
The Vijaynagar Steel Plant at Hosapete in Karnataka was developed using indigenous technology.
The Salem Steel Plant in Tamil Nadu (1982).
The Cotton Textile Industry
One of the traditional industries of India. India was famous worldwide for the production of muslin, calicos, chintz and other different varieties of fine cotton cloth.
Favourable factors for the development of cotton textile industry in India

It is a tropical country and cotton is the most comfortable fabric for a hot and humid climate.

Large quantity of cotton was grown in India.

Abundant skilled labour

In some areas the people were producing cotton textiles for generations and transferred the skill from one generation to the other and in the process perfected their skills.

The British exported raw cotton to their mills in Manchester and Liverpool and brought back the finished products to be sold in India.

This cloth was cheaper because it was produced at mass scale in factories in U.K. as compared to the cottage based industries of India.
Favourable factors for the development of Cotton textile industry in Mumbai

The first modern cotton mill was established in Mumbai in 1854.

Favourable factors for the development of Cotton textile industry in Mumbai

Very close to the cotton producing areas of Gujarat and Maharashtra.

Raw cotton used to be brought to Mumbai port to be transported to England.

Therefore, cotton was available in Mumbai city itself.

Availability of capital

Availability of cheap and abundant labour

The machinery required for a cotton textile mill could be directly imported from England
Two more mills, the Shahpur Mill and the Calico Mill were established in Ahmedabad.

By 1947, the number of mills in India went up to 423 but the scenario changed after partition, and this industry suffered a major recession.

This was due to the fact that the most of the good quality cotton growing areas had gone to West Pakistan and India was left with 409 mills and only 29 per cent of the cotton producing area.
The cotton textile industry in India can be broadly divided into two sectors

The organised sector and

The unorganised sector.
Location of Cotton textile industries depend on:

- Raw material
- Power to drive the looms
- Labour
- Capital
- Market
After the first mills were set up in Mumbai and Ahmedabad in the second half of the nineteenth century, the cotton textile industry expanded very rapidly. The number of units increased

Reasons:
1. The Swadeshi movement
2. After 1921, with the development of the railway
In southern India, mills were set up at Coimbatore, Madurai and Bengaluru.

In central India, Nagpur, Indore, Solapur and Vadodara became cotton textile centres.

Cotton textile mills were set up at Kanpur based on local investment.

Mills were also set up at Kolkata due to its port facilities.
Presently, the major centres of the cotton textile industry are Ahmedabad, Bhiwandi, Solapur, Kolhapur, Nagpur, Indore and Ujjain.

All these centres are the traditional centres and are located close to the cotton producing regions. Maharashtra, Gujarat and Tamil Nadu are the leading cotton producing states. West Bengal, Uttar Pradesh, Karnataka, and Punjab are the other important cotton textile producers.
Sugar Industry

Second most important agro-based industry in India. India is the largest producer of both sugarcane and cane sugar and contributes about 8 per cent of the total sugar production in the world.

Khandasari and gur or jaggery are also prepared from sugarcane. Provides employment for more than 4 lakh persons directly and a large number of farmers indirectly

Seasonal industry because of the seasonality of raw materials.
Development of the industry on modern lines dates back to 1903, when a sugar mill was started in Bihar. Subsequently, sugar mills were started in other parts of Bihar and Uttar Pradesh. In 1950-51, 139 factories were in operation. The number of sugar factories rose to 662 in 2010-11.
Location of the Sugar Industry

Sugarcane is a weight-losing crop.
The ratio of sugar to sugarcane varies between 9 to 12 per cent depending on its variety.
sucrose content begins to dry during haulage after it has been harvested from the field.
Better recovery of sugar is dependent upon its being crushed within 24 hours of its harvesting.

Sugar factories hence, are located within the cane producing regions.
leading sugar producer - Maharashtra produces more than one-third of the total production. Uttar Pradesh is the second largest producer of sugar. The sugar factories are concentrated in two belts – the Ganga-Yamuna doab and the tarai region.
<table>
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<tr>
<th>MAJOR PRODUCING STATES</th>
<th>IMPORTANT CENTRES</th>
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<td>• Maharashtra</td>
<td>Manmad in the north to Kolhapur in the south.</td>
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</table>
| • Uttar Pradesh        | * The Ganga-Yamuna doab and the tarai region.  
                           • Saharanpur, Muzaffarnagar, Meerut, Ghaziabad, |
| Tamil Nadu             | Coimbatore, Vellore, Tiruvanamalai, |
| Karnataka              | Belagavi, Ballari, Mandya, Shivamogga, |
| Bihar                  | Saran, Champaran, Muzaffarnagar, Siwan, |
| Punjab                 | Gurdaspur, Jalandhar, Sangarur, Patiala |
This group of industries has been growing very fast in India. In 1960s, demand for organic chemicals increased so fast that it became difficult to meet this demand. At that time, petroleum refining industry expanded rapidly. Many items are derived from crude petroleum, which provide raw materials for many new industries, these are collectively known as petrochemical industries.
This group of industries is divided into four sub-groups

(i) polymers,
(ii) synthetic fibres,
(iii) elastomers, and
(iv) surfactant intermediate.
Mumbai is the hub of the petrochemical industries.

Cracker units are also located in Auraiya (Uttar Pradesh), Jamnagar, Gandhinagar and Hajira (Gujarat), Nagothane, Ratnagiri (Maharashtra), Haldia (West Bengal) and Vishakhapatnam (Andhra Pradesh).
Haldia Petrochemicals (W.BENGAL)
Mumbai is the hub of the petrochemical industries
Three organisations are working in the petrochemical sector

<table>
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<th>organisations</th>
<th>responsibility</th>
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<tbody>
<tr>
<td>1</td>
<td>The Indian Petrochemical Corporation Limited (IPCL)</td>
<td>responsible for the manufacture and distribution</td>
</tr>
<tr>
<td></td>
<td>• Petrofils Cooperative Limited (PCL)</td>
<td>• a joint venture of the Government of India and Weaver’s Cooperative Societies.</td>
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<td>2</td>
<td></td>
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<tr>
<td>3</td>
<td>• Central Institute of Plastic Engineering and Technology (CIPET)</td>
<td>• involved in imparting training in petrochemical industry</td>
</tr>
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</table>
CIPET- CHENNAI
Polymers are made from ethylene and propylene, obtained in the process of refining crude oil, used as raw materials in the plastic industry. Polyethylene is a widely used thermoplastic. Plastic is first converted into sheets, powder, resin and pellets, and then used in manufacturing plastic products. Plastic products are preferred because of their strength, flexibility, water and chemical resistance and low prices.

The National Organic Chemicals Industries Limited (NOCIL), established in private sector in 1961, started the first naphtha based chemical industry in Mumbai. The plants located at Mumbai, Barauni, Mettur, Pimpri and Rishra are the major producers of plastic materials.
Synthetic fibres are widely used in the manufacturing of fabrics because of their inherent strength, durability, washability, and resistance to shrinkage.

Industries manufacturing nylon and polyester yarns are located at Kota, Pimpri, Mumbai, Modinagar, Pune, Ujjain, Nagpur and Udhna.

Acrylic staple fibre is manufactured at Kota and Vadodara.
Due to its non-biodegradable quality it has emerged as the greatest threat to our environment.
Hence, use of plastic is being discouraged in different states of India
KNOWLEDGE BASED INDUSTRIES
The advancement in information technology has had a profound influence on the country’s economy.

The Information Technology (IT) revolution opened up new possibilities of economic and social transformation.

The IT and IT enabled business process outsourcing (ITES-BPO) services continue to be on a robust growth path.

Indian software industry has emerged as one of the fastest growing sectors in the economy.

The Indian government has created a number of software parks in the country.

The IT software and services industry account for almost 2 per cent of India’s GDP.
India’s software industry has achieved a remarkable distinction for providing quality products.

A large number of Indian software companies have acquired international quality certification.

A majority of the multinational companies operating in the area of information technology have either software development centres or research development centres in India.

However, in the hardware development sector, India is yet to make any remarkable achievements.

A major impact of this growth has been on employment creation, which is almost doubled every year.
Liberalisation, Privatisation, Globalisation (LPG) and Industrial Development in India

The new Industrial Policy was announced in 1991.

The major objectives of this policy were to build on the gains already made, correct the distortions or weaknesses that have crept in maintain a sustained growth in productivity and gainful employment and attain international competitiveness.
In the framework of the new policy the government took the following steps:

- Abolition of industrial licensing
- Free entry to foreign technology
- Foreign investment policy
- Access to capital market
- Open trade
- (6) Aof phased manufacturing programme
- (7) Liberalised industrial location programme
The policy has three main dimensions:

Liberalisation
Privatisation
Globalisation
Globalisation
Liberalisation
Privatisation
The industrial licensing system has been abolished for all except six industries related to security, strategic or environmental concerns. The number of industries reserved for public sector were brought down from 17 to 4. Shares of public enterprises were offered to financial institutions, general public and workers.
No industry requires prior approval for investing in the delicensed sector. They only need to submit a memorandum in the prescribed format.
In the new industrial policy, Foreign Direct Investment (FDI) has been seen as a supplement to the domestic investment for achieving a higher level of economic development.

FDI benefits the domestic industry as well as the consumers by providing technological upgradation, access to global managerial skills and practices, optimum use of natural and human resources, etc.

Industries are discouraged in or very close to large cities due to environmental reasons.

The industrial policy has been liberalised to attract private investor both domestic and multi-nationals.
But FDI did not reach the expected mark. There has been a big gap between approved and actual foreign direct investment, even though the numbers of foreign collaborations are increasing. Larger parts of this investment have gone to domestic appliances, finance, services, electronics and electrical equipment, and food and dairy products.
Globalisation means integrating the economy of the country with the world economy. Under this process, goods and services along with capital, labour and resources can move freely from one nation to another.
In Indian context, this implies:
Opening of the economy to foreign direct investment by providing facilities to foreign companies to invest in different fields of economies activity in India;
Removing restrictions and obstacles to the entry of multinational companies in India;
Allowing Indian companies to enter into foreign collaboration in India and also encouraging them to set up joint ventures abroad;
Import liberalisation programmes were implemented & import duties are considerably reduced
Instead of a set of export incentives, opting for exchange rate adjustments for promoting export
INDUSTRIAL REGIONS IN INDIA
Industries are not evenly distributed in the country. They tend to concentrate on certain locations because of the favourable locational factors.
Several indices are used to identify the clustering of industries, important among them are:

(i) the number of industrial units,
(ii) number of industrial workers,
(iii) quantum of power used for industrial purposes,
(iv) total industrial output, and
(v) value added by manufacturing, etc.
Major industrial regions of the country

1. Mumabi-Pune Region,
2. Hugli Region,
3. Bengaluru-Tamil Nadu Region,
4. Gujarat Region,
5. Chotanagpur Region,
6. Vishakhapatnam-Guntur Region,
7. Gurgaon-Delhi-Meerut Region, and
8. Kollam-Thiruvananthapuram Region
Industrial Regions and Districts

Major Industrial Regions (8)

Minor Industrial Regions (13)

Industrial Districts (15)
MUMBAI-PUNE INDUSTRIAL REGION

Extends from Mumbai-Thane to Pune and in adjoining districts of Nashik and Solapur.

FAVOURABLE FACTORS FOR THE DEVELOPMENT OF THIS INDUSTRIAL REGION
Location of cotton textile industry in Mumbai.
Opening of the Suez Canal in 1869
Mumbai port & Machineries were imported through this port.
Hydro-electricity was developed in the Western Ghat region
Development of chemical industry
Opening of the Mumbai High petroleum field and
Erection of nuclear energy plants
Important industrial centres are Mumbai, Kolaba, Kalyan, Thane, Trombay, Pune, Pimpri, Nashik, Manmad, Solapur, Kolhapur, Ahmednagar, Satara and Sangli.
Located along the Hugli river,
Extends from Bansberia in the north to Birlanagar in the south for a distance of about 100 km.
Kolkata-Haora from the nucleus of this industrial region.
Historical, geographical, economic and political factors have contributed much to its development.
Developed with the opening of river port on Hugli.
Kolkata emerged as a leading centre of the country.
Development of tea plantations in Assam and northern hills of West Bengal
Cheap labour available from thickly populated part of Bihar, eastern Uttar Pradesh and Odisha
Kolkata, being the capital city of British India (1773-1911), attracted the British capital.

Development of Jute industries (first jute mill at Rishra in 1855)
The major concentration of jute industry is at Haora and Bhatapara.
The partition of the country in 1947 adversely affected this industrial region.

Major Industries - Cotton textile industry, paper, engineering, textile machinery, electrical, chemical, pharmaceuticals, fertiliser and petrochemical industries.

Location of petroleum refinery at Haldia has facilitated the development of a variety of industries.

Important industrial centres of this region are Kolkata, Haora, Haldia,
Bengaluru-Chennai Industrial Region

This region witnessed most rapid industrial growth in post-Independence period.

All the districts of Tamil Nadu except Viluppuram have industries. Since, this region is away from the coalfields, its development is dependent on the Pykara hydroelectric plant, which was built in 1932.

Development of Cotton textile industry

Aircraft (HAL), machine tools, telephone (HTL) and Bharat Electronics are industrial landmarks of this region.

Important industries are textiles, rail wagons, diesel engines, radio, light engineering goods,
The nucleus of this region lies between Ahmedabad and Vadodara & extends up to Valsad and Surat in the south and to Jamnagar in the west.

Development of this region is also associated with the location of the cotton textile industry since 1860s.

Located in cotton growing area, this region has double advantage of the proximity of raw materials as well as of market.

The discovery of oil fields led to the establishment of petrochemical industries around Ankleshwar, Vadodara and Jamnagar.

Kandla Port helped rapid development of this region.

Petroleum refinery at Koyali provided raw materials to several petrochemical industries.
Major Industries - cotton textiles, petrochemical industries, heavy and basic chemicals
Recently, largest petroleum refinery has been set up at Jamnagar.
Important industrial centres of this region are Ahmedabad, Vadodara, Bharuch, Koyali, Anand
Chotanagpur Region

Extends over Jharkhand, northern Orissa and western West Bengal and is known for the heavy metallurgical industries.

This region owes its development to the discovery of coal in the Damodar Valley and metallic and non-metallic minerals in Jharkhand and northern Orissa.

Proximity of coal, iron ore and other minerals facilitated the location of heavy industries in this region.

Six large integrated iron and steel plants at Jamshedpur, BurnpurKulti, Durgapur, Bokaro and Rourkela are located within this region.

To meet the power requirement, thermal and hydroelectric plants have been constructed in the Damodar Valley.

Densely populated surrounding regions provide cheap labour and Hugli region provides vast market for its industries.

Heavy engineering, machine tools, fertilisers, cement, paper, locomotives and heavy electricals are some of the important industries.

Important centres are Ranchi, Dhanbad, Chaibasa, Sindri, Hazaribag.
Vishakhapatnam-Guntur Region

Extends from Vishakhapatnam district to Kurnool and Prakasam districts in the south.

Industrial development of this region hinges upon Vishakhapatnam and Machilipatnam ports and developed agriculture and rich reserves of minerals in their hinterlands.

Coalfields of the Godavari basin provide energy.

Ship building industry was started at Vishakhapatnam in 1941. Petroleum refinery based on imported petroleum facilitated the growth of several petrochemical industries.

Sugar, textile, jute, paper, fertiliser, cement, aluminium and light engineering are principal industries of this region.

One lead-zinc smelter is functioning in Guntur district.
Industries located in this region have shown very fast growth in the recent past.

Located far away from the mineral and power resources, the industries are light and market-oriented.

Electronics, light engineering and electrical goods are major industries of this region.

Other - cotton, woollen and synthetic fabrics, hosiery, sugar, cement, machine tools, tractor, cycle, agricultural implements, chemical and vanaspati industries

Software industry is a recent addition.

Agra-Mathura industrial area specialises in glass and leather goods.

Mathura with an oil refinery is a petrochemical complex.

Important industrial centres- Gurgaon, Delhi,
Kollam-Thiruvananthapuram Region

Spread over Thiruvananthapuram, Kollam, Alwaye, Ernakulam and Alappuzha districts.

**Favourable factors**

- Plantation agriculture and hydropower provide industrial base
- Located far away from the mineral belt, agricultural products processing and market oriented light industries predominate
- Major industries - cotton textile, sugar, rubber, matchbox, glass, chemical fertiliser and fish-based industries, Food processing, paper, coir products, aluminium and cement industries
- Location of petroleum refinery at Kochchi
- Important industrial centres-Kollam, Thiruvananthapuram, Alluva, Kochchi, Alappuzha, and Punalur.
Thanks

Sivakumar K