12th Standard Geography

Manufacturing Industries

Types of Industries

There are various ways to classify industries:

On the basis of size capital investment and labour force employed:

1. Large scale industries
2. Medium scale industries
3. mall scale and cottage industries

On the basis of ownership:

1. Public sector industries
2. Private sector industries
3. Joint and cooperative sector

On the basis of use of finished goods:

1. Basic goods industries
2. Capital goods industries
3. Intermediate goods industries
4. Consumers goods industries

On the basis of raw materials used by them:

1. Agriculture based industries
2. Forest based industries
3. Mineral based industries
4. Industrially processed raw material based industries

On the basis of nature of the manufactured products:

1. Metallurgical industries
2. Mechanical engineering industries
3. Chemical and allied industries
4. Textiles industries
5. Food processing industries
6. Electricity generation
7. Electronics
8. Communication industries

Location of Industries

- Location of industries is determined by important factors i.e. raw materials, power resources, water, labour, markets and the transport facilities.
- Raw materials and industries are inter-related to each other. Most of the manufacturing industries are located at a place where cost of production and cost of delivery of finished goods are least.

- Nature of raw materials and finished goods decide the cost of transportation.

Factors of Industrial Location

The following factors influence the location of industries:

Raw materials

- Industries using raw materials which are perishable or lose weight in the process of manufacture are usually located near the source of the raw materials.
- For example, sugar mills, pulp industries, copper smelting, pig iron industries, etc.
- Iron and steel industries are mostly located near coalfields (e.g. Bokaro, Durgapur) or near source of iron-ore (Bhadravati, Bhilai, Rourkela) as both iron-ore and coal lose their weight during the process of manufacturing of steel.

  Power
- Power is must for every industry so supply of power should be ensured before locating any industry. For e.g. aluminum and synthetic nitrogen manufacturing industries.

Market

- Market is an important factor for market oriented industries as market provide outlets for manufactured products like heavy machines, machine tools, heavy chemicals, to sell finished goods.

- For example, Petroleum refineries like Koyali, Mathura and Barauni are located near markets so that the products derived from them can be used as raw material in other industries.

Transport

- It is important for the location of industries to move goods and labour from industrial area to markets and others.
- For example, around Delhi, Mumbai, Chennai and Kolkata, the concentration of industries is maximum.

Labour

- It is another important factor of the location of industries.
- Due to our large population, labour is quite mobile and is available in large numbers.

Historical Factors

Colonial influence like competition from the British goods and the British discriminatory policies, are also important reasons for the emergence of some of our industrial nodes (like, Mumbai, Kolkata and Chennai) and manufacture centres (like Murshidabad, Dhaka, Bhadohi, Surat, Vadodara, Kozhikode, Coimbatore, Mysore, etc).

Industrial Policy

1. To bring balanced regional development and to eradicate regional disparities in the economy, are the main objectives of our democratic country.
2. India attempts to promote backward areas like tribal areas into economic development process by providing lots of incentives. For example, establishment of iron and steel industry in Bhilai and Rourkela were based on decision to develop backward tribal areas of the country.

Major Industries

Some of the major industries of our country are discussed below:

The Iron and Steel Industry

The iron and steel industry provides basic infrastructure to almost all sectors of the Indian industry. The raw materials used in this industry, iron-ore, cooking coal, limestone, dolomite, manganese and fire clay are found in parts of Chhattisgarh, Northern Odisha, Jharkhand and Western West Bengal.
This industry comprises of large integrated steel plants as well as mini steel mills and also includes secondary producers, rolling mills and ancillary industries.
Some integrated steel plants are:

TISCO

The Tata Iron and Steel Plant lies near to Mumbai-Kolkata railway line and about 240 km away from Kolkata which is nearest port for the export of steel. This industry gets its raw materials from different source regions like:

1. Water supply from Subamarekha and Kharkai rivers.
2. Iron-ore from Noamundi and Badam Pahar.
3. Coal from Joda mines in Odisha.
4. Coking coal from coal fields of Jharia and West Bokaro.

IISCO

The first factory of the Indian Iron and Steel Company (IISCO) was set-up at Hirapur and another at Kulti. In 1937, the steel corporation of Bengal was established in association with IISCO by setting up another unit at Bunpur (West Bengal).
IISCO gets its raw materials from different source regions like:

1. Coal from Damodar valley coal fields (Raniganj, Jharia and Ramgarh).
2. Iron-ore from Singhbhum in Jharkhand.
3. Water supply from river Barakar (a tributary of Damodar river).

The Kolkata- Asansol railway line runs along the plants. Later in 1972-73, the government took over the IISCO plant because of the fall of steel production.

Visvesvaraiya Iron and Steel Works Ltd. (VISL)
Initially named Mysore Iron and Steel Works, the VISL is located at the banks

of Badravati in Shimoga district of Karnataka. This plant produces specialised steels and alloys.

VISL gets raw materials from:

1. It gets iron ore from Kemangundi in the Bababudan hills, limestone and manganese from the local area.
2. water supply from the Bhadravati river.
3. Due to unavailability of coal in this region, at the beginning charcoal was used as fuel by burning wood till 1951. Later, electric furnaces were installed which use hydroelectricity from the Jog falls hydel power project.

During the second five years plan (1956-61), three new public sector integrated steel plants were set up with foreign collaboration i.e. Rourkela in Odisha, Bhilai in Chhattisgarh and Durgapur in West Bengal.

These were under Hindustan steel Limited (HSL). In 1973, the Steel Authority of India Limited (SAIL) was created to manage these plants.

Rourkela Steel Plant

This plant was established in 1959 in the Sundargarh district of Odisha in collaboration with Germany.

This plant gets its raw materials from different sources region like:

1. Coal from Jharia.
2. Iron-ore from Sundargarh and Kendujhar districts.
3. Hydro-electric power from Hirakud Power Project.

4. Water from Koel and Sankh rivers.

Bhilai Steel Plant

It was set up with Russian collaboration in Durg district of Chhattisgarh and started production in 1959.
It gets its raw material from different places like:

1. Coal from Korba and Kargali.
2. Water from Tanduladam.
3. Power from Korba thermal power station.

This plant is connected with Kolkata-Mumbai railway line. This plant supplies the bulk of steel to the Hindustan Shipyard at Vishakhapatnam.

Durgapur Steel Plant

It was set up in .collaboration with the Government of United Kingdom in West Bengal and started production in 1962.
It gets its raw material from the following places:

1. Coal from Jharia and Raniganj.
2. Iron-ore from Noamundi.
3. Water and hydel power from Damodar Valley Corporation (DVC).

It lies on the main Kolkata-Delhi railway route.

Bokaro Steel Plant

Bokaro steel plant was set up in 1964 with Russian collaboration at Bokaro. It aims at transport cost minimisation by creating Bokaro-Roukela combine. The raw materials and their source regions are:

1. Iron-ore from Rourkela.
2. Water and Hydel power from Damodar Valley Corporation (DVC).
3. Other raw materials come from within a radius of about 350 km.

Other Steel Plants

In the Fourth Five Year Plan, three new steel plants were set up away from the main raw materials sources, namely:

1. The Vizag Steel Plant in Vishakhapatnam in Andhra Pradesh is the first port based plant which started operating in 1992.
2. The Vijayanagar Steel Plant at Hospet in Karnataka.
3. The Salem Steel Plant in Tamil Nadu was commissioned in 1982.

There are also more than 206 units in India which use scrap iron as main raw material and process it in electric furnaces.

The Cotton Textile Industry

This industry is one of the traditional industries of India. The first successful modem cotton textile mill was established in Mumbai in 1854. Beause, it is very close to the cotton producing areas of Gujarat and Maharashtra and being

a large town, provide employment opportunities to many people. After the first mill, two more mills, the Shahpur mill and the Calico mill were established in Ahmedabad (Gujarat). But, after partition, India was left with 409 mills out of 423 mills and only 29% of the cotton progrowing area.

The cotton textile industry can be classified as organised and decentralised sectors. The decentralised sector includes cloth produced in handlooms (including khadi) and powerlooms. On the other hand, production of the organised sector has drastically fallen from 81% in the mid twentieth century to only about 6% in 2000. Now powerlooms on the decentralised sector produce more than the handloom sector. As cotton does not lose weight in the manufacturing process, hence the location of cotton textile industry is determined by other factors like power supply, labour, capital or market.

At present, market is the most preferred factor to locate industry as market decides what is the current trend of clothes. After first cotton textile mills were set up in Mumbai and Ahmedabad, the cotton textile industry expanded very rapidly. Development of the railway network also contributed to the expansion of mills. In southern India, mills were set up at Coimbatore, Madurai and Bangaluru.

In central India, mills were set up at Nagpur, Indore, Solapur and Vadodra. Mills were also set up at Kanpur and Kolkata. Availability of hydel power favoured the setting up of cotton mills in Tamil Nadu. Availability of cheap labour favoured the setting up of cotton mills at Ujjain, Bharuch, Agra, Hathras, Coimbatore and Tirunelveli.

Distribution of Cotton Textile Industries

- In present time, important centres of cotton textile industries are Ahmedabad, Bhiwandi, Solapur, Kolhapur, Nagpur, Indore and Ujjain. 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.
- Tamil Nadu has largest number of mills and most of them produce yam rather than cloth. Coimbatore accounts for 50% of total mills. Other important centres are Chennai, Madura, Tirunelveli, Tuticorin, Thanjavur, Ramanathapuram and Salem.
- In Karnataka, Bengaluru, Hubli Devangera, Bellary, Mysore are some important centres.
- The cotton textile industry has developed in cotton producing Telangana region. The important centres are Hyderabad, Secunderabad and Warangal in Telangana and Guntur in Andhra Pradesh.
- Most of the cotton textile industry has developed in the Western part of Uttar Pradesh. Kanpur is the largest centre and known as Manchester of Uttar Pradesh. Other important centres are Agra, Modinagar, Sahranpur, Lucknow and Hathras.
- In West Bengal, important centres are Kolkata, Serampur, Howrah and Shyamnagar.
- Cotton textile industry has been facing tough competition from synthetic cloth.

Sugar Industry

The sugar industry being the second largest agro-based industry in India, is the largest producer of both sugar and sugarcane. It contributes about 8% of the total sugar production in the world.
The first sugar mill was established in 1903 in Bihar and then many mills were established in many parts of Bihar and Uttar Pradesh.
This industry provides employment to more than 4 lakh persons and large number of farmers. It is a seasonal Industry.

Location of the Sugar Industry

As sugarcane is a heavy, low value, weight losing and perishable raw material, thus sugar factories are located mostly in sugarcane growing regions.
Maharashtra has emerged as a leading sugar producer in the country and produces more than one-third of the total production of the sugar in the country. Uttar Pradesh is now the second largest producer of sugar.
There are two belts where sugar factories are located:

- **The Ganga-Yamuna Doab** Saharanpur, Muzaffamagar, Meerut, Ghaziabad, Baghpat and Bulandshar districts.
- **Tarai region** Lakhimpur Kheri, Basti, Gonda, Gorakhpur, Bahraich distiricts.

Sugar producing States

Tamil Nadu has sugar factories in Coimbatore, Vellore, Tiruvanamalai, Villupuram and Tiruchchirappalli districts.
In Karnataka, the important sugar producers are Belgaum, Bellary, Mandya, Shimoga, Bijapur, and Chitradurg.
The industry is distributed in the coastal regions i.e. East Godavari, West Godavari, Vishakhapatnam districts and Nizamabad, and Medak districts of Telangana alongwith Chittoor district or Rayalseema.

Other sugar producing states are:

- **Bihar** Saran, Champaran, Muzaffarpur, Si wan, Dharbanga, Gaya.
- **Punjab** Gurdaspur, Jalandhar, Sangarur, Patiala, Amritsar.
- **Haryana** Yamuna Nagar, Rohtak, Hissar, Faridabad.
- **Gujarat** Sugar industry is comparatively new here. Important sugar producing mills are located in Surat, Junagarh, Rajkot, Amreli, Valsad and Bhavnagar districts.

Petrochemical Industries

This group of industries has been growing very fast in India. The demand of its products is very high since 1960s. Many items are derived from crude petroleum, which provide raw materials for many new industries, these are collectively known as petrochemical industries.
Petrochemical industries are divided into four sub-groups:

1. Polymers
2. Synthetic fibres
3. Elastomers
4. Surfactant intermediate

Distribution of Petrochemical Industries Mumbai is the hub of the petrochemical industries. Other cracker units are at Auraiya (Uttar Pradesh), Jamnagar, Gandhinagar and Hajira (Gujarat), Nogothane, Ratnagiri (Maharashtra), Haldia (West Bengal) and Vishakhapatnam (Andhra Pradesh). There are three organisations which are working in the petrochemical sector under the administrative control of the department of chemicals and petrochemicals:

- **Indian Petrochemical Corporation Limited** It is a public sector undertaking and responsible for the manufacturing and distribution of the polymers, chemicals, fibres and fibre intermediates.
- **Petrofies Cooperative Limited (PCL)** It is a joint venture of the government of India and weaver's cooperative societies. It has two plants at Vadodara and Maldhari where polyester filament yam and nylon chips are produced.
- **Central Institutes of Plastic Engineering and Technology (CIPET)** It is involved in imparting training in petrochemical industry.

Sub-Groups of Petrochemical Industries

Polymers are made from ethylene and propylene which are obtained after refining crude oil. It provides the basic raw material for plastic industry which

are preferred because of their strength, flexibility, water and chemical resistance and low prices.
The National Organic Chemical Industries Limited (NOCIL) established in 1961 and started first naphtha based chemical industry in Mumbai. The major producers of plastic materials are Mumbai, Barauni, Mettur, Pimpri and Rishra.

About 75% of these units are in small scale sector. The industry also uses recycled plastics which constitutes about 30% of the total production. Synthetic fibres are widely used in the manufacturing of fabrics because of their durability, washability and resistance to shrinkage.

The important fibres and their producing centres are Nylon and Polyester industries at Kota, Pimpri, Mimbai, Modinagar, Pune, Ujjain, Nagpur and Udhna and Acrylic Staple Fibre Industries at Kota and Vadodara.
Now, plastic has emerged as greatest threat to our environment because of its non-biodegradable quality.

Knowledge Based Industries

- The IT and IT enabled business process outsourcing (ITES-BPO) services continue to grow with an outstanding rate.
- A number of software park have been created by the government and the production of the software industries has surpassed electronic hardware production.
- The contribution of the IT software and services industry in India's GDP is about 2%.

- Most of the multinational companies in IT field has re-established software or research development centres in India.
- In hardware development sector, India has yet not achieved so much but in IT sector, it creates double employment rate every year.

Liberalisation, Privatisation, Globalisation (LPG) and Industrial Development in India

The new industrial policy was annouced in 1991 with the following objectives:

1. To build on the gains already made.
2. Correct the distortions or weaknesses that have crept in.
3. Maintain a sustained growth in productivity, and gainful employment.
4. Attain international competitiveness.

Following were the policy measures taken under LPG:

1. Abolition of industrial licensing.
2. Free entry to foreign technology.
3. Foreign Investment Policy
4. Access to capital market.
5. Open trade
6. Abolition of phased manufacturing programme.
7. Liberalised industrial location programme.

The policy has three main dimensions Liberalisation, Privatisation, and globalisation. Except six industries based on security, strategic or

environmental concerns, for all industries the licensing system has been abolished. The number of industries reserved for public sector since 1956 have been reduced from 17 to 4. Department of atomic energy as well as railways have remained under the public sector. For investment in delicensed sector no prior approval is required. Foreign Direct Investment (FDI) became supplement to domestic investment in achieving a higher level of economic development in this policy. The industrial policy has been liberalised to attract private investor both domestic and multi-nationals.

Globalisation refers to the integration of the country's economy with the world economy. There is free flow of goods and services, labours, capitals from one nation to another. Globalisation aimed at increasing domestic and external competition through market mechanism and facilitating dynamic relationship with the foreign investors and suppliers of technology.
In Indian context, globalisation has following objectives:

- Opening of the economy to foreign direct investment by providing facilities to foreign companies to invest in different fields of economic activities in India.
- Removing restrictions and obstacles to the entry of multi-national companies in India.
- Allowing Indian companies to enter into foreign collaboration in India and also encouraging them to set up joint ventures abroad.
- Carrying out massive import liberalisation programmes by switching over from quantitative restrictions to tariffs in the first place and then bringing down the level of import duties considerably.

- Instead of a set of export incentives, opting for exchange rate adjustments for promoting export.

Adverse Effect of LPG

- Infra structural sector was remained untouched while major share went to core sectors.
- The gap between developed and developing states has became wider and inter-regional disparity has been increased, e.g. out of total investment from 1991-2000, one fourth (23%) was for Maharashtra, 17% for Gujarat, 7% for Andhra Pradesh about 6% for Tamil Nadu, and only 8 % for Uttar Pradesh. Thus, the share of both domestic and foreign investment went to already developed states. Share of both domestic and foreign investment went to already developed states.
- Economically weaker states could not compete with developed states in open market in attracting industrial investment.

Industrial Regions In India

Due to favourable factors, most of the industries are located in a few pockets. The pockets having high concentration of industries are known as industrial clusters.
Several indices are used to identify the clustering of industries, important among them are:

1. the number of industrial units
2. number of industrial workers

3. quantum of power used for industrial purposes
4. total industrial output
5. value added by manufacturing

Industrial Regions and Districts

Major industrial Regions

1. Mumbai-Puna region
2. Hugli region
3. Bengaluru, Tamil Nadu region
4. Gujarat region
5. Chotanagpur region
6. Vishakhapatnam-Guntur region
7. Gurugram-Delhi-Meerut region
8. Kollam-Thiruvananthapuram region

Minor Industrial Regions

1. Ambala-Amritsar
2. Saharanpur-Muzaffarnagar-Bijnor
3. Indore-Dewas Ujjain
4. Jaipur-Ajmer
5. Kolhapur-South Kannada
6. Northern Malabar
7. Middle Malabar
8. Adilabad-Nizamabad

9. Allahabad-Varanasi-Mirzapur
10. Bhojpur-Munger
11. Durg-Raipur
12. Bilaspur-Korba
13. Brahmaputra valley

Industrial Districts

1. Kanpur
2. Hyderabad
3. Agra
4. Nagpur
5. Gwalior
6. Bhopal
7. Lucknow
8. Jalpaiguri
9. Cuttack
10. Gorakhpur
11. Aligarh
12. Kota
13. Purnia
14. Jabalpur
15. Bareilly

Major industrial regions of India are as follows:

Mumbai-Pune Industrial Region

It extends from Mumbai-Thane to Pune and in adjoining districts of Nashik and Solapur. Besides, Kolaba, Ahmednagar, Satara, Sangli and Jalagaon districts also have industries.

Factors which favoured the location of this region are:

1. Development of cotton textile industry in Mumbai.
2. Opening of the Suez Canal in 1869 gave impetus to Mumbai port.
3. Machineries were possible to import through this port.
4. Development of hydro-electricity in Western Ghat region.

Later, a number of industries were developed like chemical industry, Mumbai High petroleum field, nuclear energy plants, engineering goods, petrochemicals, leather, drugs, fertilizers, shipbuilding software, transport equipments and food industries, etc. Important industrial centres are Mumbai, Kolaba, Kalyan, Thane, Trombay, Pune, Pimpri, Nashik, Manmad, Solapur, Kolhapur, Ahmednagar, Satara and Sangli.

Hugli Industrial Region

Located along the Hugli river, this region extends from Bansberia in the north to Birlanagar in the t south and in Mednipur in the west.

Factors which are responsible for the location of industries here are:

1. Opening of river port on Hugli river.
2. Kolkata emerged as a leading centre and connected with interior parts by railway lines and road routes.

3. Development of tea plantations in Assam and northern hills of West Bengal.
4. Opening of coalfields of the Damodar valley and iron-ore .deposits of the Chotanagpur plateau.
5. The processing of indigo earlier and jute later.
6. Availability of labour from Bihar, eastern Uttar Pradesh and Odisha.
7. Kolkata attracted British capital as it was the capital city of the Britishers.
8. The establishment of first jute mill at Rishra in 1855 ushered in the era of modem industrial clustering in this region.
9. Location of petroleum refinery at Haldia has ' facilitated the development of a variety of industries here.

The major concentration of jute industry is at Haora and Bhatapara. Important industries are cotton textile, jute, paper, engineering, textile machinery, electrical, chemical, pharmaceuticals, fertiliser and petrochemical industries. Factory of the Hindustan motors limited at Konnagar and diesel engine factory at Chittaranjan are landmarks of this region. The major industrial centres are Kolkata, Haora, Haldia, Serampur, Rishra, Shippur, Naihati, Kakinara, Shamnagar, Titagarh, Sodepur, Budge Budge, Birlanagar, Bansberia, Belgurriah, Triveni, Hugli, Belur, etc.

Bengaluru (Bangalore} Chennai Industrial Region

- It is spread over all the districts of Tamil Nadu except Viluppuram.
- Its development is dependent on the Pykara hydro-electric plant, which was built in 1932.

- Cotton textile industry was the first to take roots due to the presence of cotton growing areas.
- Heavy engineering industries are located at Bengaluru.
- 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, rubber goods, medicines, aluminium, sugar, cement, glass, paper, chemicals, film, cigarette, matchbox, leather goods, etc.
- Petroleum refinery at Chennai, iron and steel plant at Salem and fertilizer plants are recent developments.

Gujarat Industrial Region

The place for the basis for its activity growth lies between Ahmedabad & Vadodara but this region Extends up to valsad & Surat in the South & to Jamnagar in the west.

Location factors of industries in this region are:

1. Decline of the cotton textile industry at Mumbai.
2. This region is located in cotton growing area, hence raw material and market are easily available.
3. The discovery of oil fields led to the establishment of petrochemical industries around Ankushwar, Vadodara, Jamnagar .
4. Development of Kandla port.
5. Petroleum refinery at Koyali.

Important industries are textiles (cotton, silk, synthetic, fabrics), petrochemical industries, heavy and basic chemicals, motor, tractor, diesel engines, textile, machinery, engineering, pharmaceuticals, dyes, pesticides, sugar, dairy products and food processing. Recently, largest petroleum refinery has been set up at Jamnagar. Important industrial centres are Ahmedabad, Vadodara, Bharuch, Koyali, Anand, Khera, Surendranagar, Rajkot, Surat, Valsed, Jamnagar.

Chotanagpur Region

This extends over Jharkhand, Northern Odisha and West Bengal. The region is well known for its heavy metallurgical industries.
Factors which are favourable for the location of industries here are:

1. Discovery of coal in the Damodar valley.
2. Metallic and non-metallic minerals in Jharkhand and northern Odisha.
3. Thermal and hydro-electric plants in the Damodar valley.
4. Cheap labour from surrounding regions,
5. Hugli provides vast market for its industries.

Important industries are heavy engineering, machine tools, fertilizers, cement, paper, locomotives, and heavy electricals. Important centres are Ranchi, Dhanbad, Chaibasa, Sindri, Hazaribag, Jamshedpur, Bokaro, Rourkela, Durgapur, Asansol and Dalmianagar.

Vishakhapatnam-Guritur Region

This region extends from Vishakhapatnam to Kumool and Prakasam districts in the South.
Important locational factors are:

1. Presently Vishakhapatnam and Machilipatnam ports, developed agriculture and rich reserves of minerals in their hinterlands.
2. Coal fields of Godavari basin.
3. Presence of petroleum refineries.

Guntur district has one lead-zine smelter. Important industries are sugar, textile, jute, paper, fertiliser, cement, aluminium and light engineering. Important centres are Vishakhapatnam,Vijayawada, Vijayanagar, Rajahmundry, Guntur, Eluru and Kumool.

Gurugram-Delhi-Meerut Region

- The industries of this region are light and market oriented as this region is far located from mineral and power resources.
- Important'industries are electronics, light engineering, electrical goods, cotton, woollen and synthetic fabrics, hosiery sugar, cement, machine tools, tractor, cycle, vanaspati, etc.
- Software industry is recently developed.
- Important industrial centres are Guru gram (Gurgaon), Delhi, Shahdara, Faridabad, Meerut, Modinagar, Ghaziabad, Ambala, Agra and Mathura.

Kollam-Thiruvananthapuram Region

- Important industrial centres are Thiruvananthapuram, Kollam, Alwaye, Emakulam, Punalur, and Alappuzha districts.
- It is away from mineral belt of India, so agricultural products processing and market oriented light industries predominate the region.
- Important industries are cotton textile, sugar, rubber, matchbox, glass, chemical fertilizers, fish-based industries, food processing, paper, coconut coir products, aluminium and cement.