1. Details of Module and its structure

Module Detail	
Subject Name	Geography
Course Name	Geography 03 (Class XII, Semester - 1)
Module Name/Title	Secondary Activity-Manufacturing Industries – Part 2
Module Id	legy_10602
Pre-requisites	Basic Knowledge about Secondary Activity Manufacturing industries
Objectives	After going through this lesson, the learners will be able to understand the following: • Household Industries or Cottage Manufacturing • Small Scale Manufacturing • Large Scale Manufacturing • Industries based on Inputs/Raw Materials • Iron and Steel Industry • Cotton Textile Industry • Industries Based On Output/Product • Industries based on Ownership • Traditional Large-Scale Industrial Regions • Concept of High Technology Industry
Keywords	Ruhr Coal-Field, Aluminium Industry, Copper Industry Jewellery Industry, Synthetic Fibre Industry

2. Development Team

Role	Name	Affiliation
National MOOC Coordinator (NMC)	Prof. Amarendra P. Behera	CIET, NCERT, New Delhi
Program Coordinator	Dr. Mohd. Mamur Ali	CIET, NCERT, New Delhi
Course Coordinator (CC) / PI	Dr. Tannu Malik	DESS, NCERT, New Delhi
Course Co-Coordinator / Co-PI	Dr. Archana	CIET, NCERT, New Delhi
Subject Matter Expert (SME)	Mr. A.K.Pandey	RPVV, Raj Niwas Marg, New Delhi
Review Team	Dr. Swagata Basu	SSV(PG) College, Hapur

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Manufacturing industries are branch of manufacture and trade based on the fabrication, processing, or preparation of products from raw materials and commodities. This includes all foods, chemicals, textiles, machines, and equipment. This includes all refined metals and minerals derived from extracted ores. Manufacturing industries are classified on the basis of their size, inputs/raw materials, output/products and ownership.

Industries based on Size

The size of an industry is determined by the amount of capital invested, number of workers employed and volume of production On the basis of these conditions, industries may be classified into household or cottage, small-scale and large-scale industries.

Household Industries or Cottage Manufacturing

These industries make up the smallest manufacturing unit. The artisans involved in these industries use local raw materials and simple tools to produce everyday goods in their homes with the help of their family members or part time labour. Finished products may be for consumption within the same household or, for sale in local (village) markets, or, for barter of other goods and services. Capital and transportation do not wield much influence in its location as this type of manufacturing has low commercial significance and most of the tools are devised locally.

Fig. No .01 A cordwainer making shoes, in Capri, Italy.
https://upload.wikimedia.org/wikipedia/commons/7/7a/Capri_-_7224.jpg

Some common everyday products produced in this sector of manufacturing include food products, fabrics, mats, containers, tools, furniture, shoes, and figurines from wood lot and forest, shoes, thongs and other articles from leather; pottery and bricks from clays and stones. Goldsmiths make jewellery of gold, silver and bronze. Some artifacts and crafts are made out of bamboo, wood obtained locally from the forests.

Fig. No 02 A bamboo basket making
https://upload.wikimedia.org/wikipedia/commons/a/a8/A_bamboo_basket_making_1.JPG

Fig. No 03 : Bamboo product making unit in Dumka, Jharkhand

https://upload.wikimedia.org/wikipedia/commons/thumb/5/5b/ESAF_Bamboo_product_making_unit_in_Dumka%2C_Jharkhand.jpg/1024px-ESAF_Bamboo_product_making_unit_in_Dumka%2C_Jharkhand.jpg

Small Scale Manufacturing

Small scale manufacturing is distinguished from household industries by its production techniques and place of manufacture (a workshop outside the home/cottage of the producer). This type of manufacturing uses local raw material, simple power-driven machines and semi-skilled labour. It provides employment and improved the local economy. The industries which employ neither very large nor very small number of labourers are a part of this category of medium scale industries. Cycle industry, radio and television industries are some examples of medium scale industries.

Fig. No 04 :Women at work in a small scale coir spinning unit at kollam

https://upload.wikimedia.org/wikipedia/commons/b/be/Women_at_work_in_a_small_scale_coir_spinning_unit_at_kollam.jpg

Fig. No 05 An embroidery unit in Dharavi in Mumbai
https://upload.wikimedia.org/wikipedia/commons/4/46/An_embroidery_unit_in_Dharavi%2C_Mumbai.jpg

Therefore, countries like India, China, Indonesia and Brazil, among others have developed labour-intensive small scale manufacturing in order for providing employment opportunities to their huge population.

Large Scale Manufacturing

Industries which employ a large number of labourers in each unit are called large-scale industries. Cotton or jute textile industries are large scale industries. Large scale manufacturing involves a large market, various raw materials, enormous energy, and specialized workers, advanced technology, assembly-line mass production and large capital. This kind of manufacturing developed in the last 200 years, in the United Kingdom, north-eastern U.S.A. and Europe. Now it has diffused to almost all over the world.

On the basis of the system of large scale manufacturing, the world's major industrial regions may be grouped under two broad types, namely (i) traditional large-scale industrial regions which are thickly clustered in a few more developed countries. (ii) high-technology large scale industrial regions which have diffused to less developed countries.

Industries based on Inputs/Raw Materials

On the basis of the raw materials used, industries may be classified as: (a) agro-based; (b) mineral based; (c) chemical based; (d) forest based: and (e) animal based.

Agro based Industries

Agro based industries procure raw materials from agricultural products. Agro processing involves the processing of raw materials from the field and the farm into finished products for rural and urban markets. Major agro-processing industries are food processing, sugar, pickles, fruits juices, beverages (tea, coffee and cocoa), spices and oils fats and textiles (cotton, jute, silk), rubber, etc.

Food Processing

Food processing is the transformation of raw ingredients, by physical or chemical means into food, or of food into other forms. Food processing combines raw food ingredients to produce marketable food products that can be easily prepared and consumed by the

consumer. Food processing typically involves activities such as mincing and macerating, liquefaction, emulsification, and cooking (such as boiling, broiling, frying, or grilling); pickling, pasteurization, and many other kinds of preservation; and canning or other packaging. (Primary-processing such as dicing or slicing, freezing or drying when leading to secondary products are also included in this activity.)

Sugar Industry:

Many cane sugar mills produce raw sugar, which is sugar that still contains molasses, giving it more colour (and any associated nutrients) than the white sugar which is normally consumed in households and used as an ingredient in soft drinks and foods. While cane sugar does not strictly need refining, sugar from beet is almost always refined to remove the strong, almost always unwanted, taste of beets from it. The refined sugar produced is more than 99 percent pure sucrose.

Sugar mills operate during a limited time of the year during the cane harvesting period, but cane sugar refineries function throughout the year. Sugar beet refineries tend to have shorter periods of operation. In these units beet is processed and stored in intermediate form and may be fully processed during the off-season.

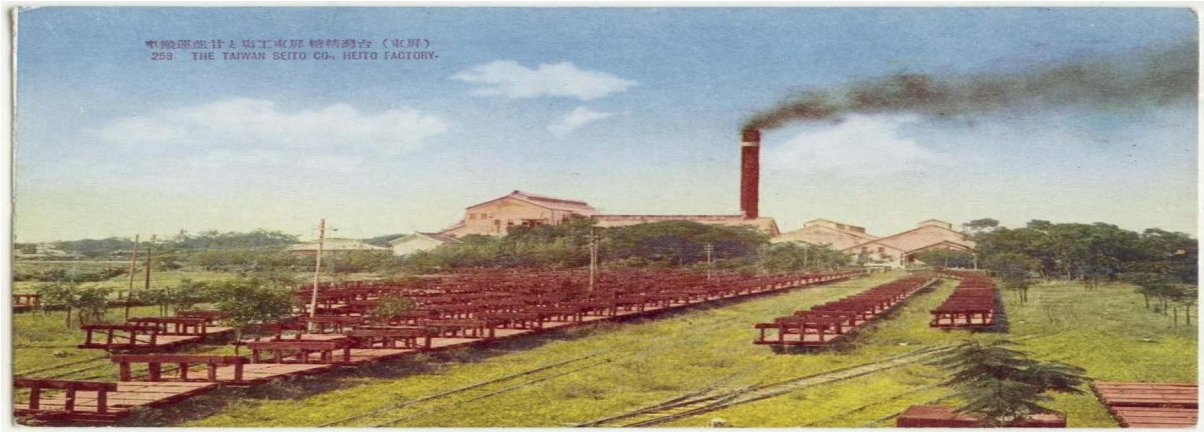

Fig. No 06 Sugar Industry Taiwan

https://upload.wikimedia.org/wikipedia/commons/5/54/Sugar_industry_Taiwan_01.jpg

Cotton Textile Industry

The cotton fiber is most often spun into yarn or thread and used to make a soft, breathable textile. The use of cotton for fabric is known to date to prehistoric times; fragments of cotton fabric dated from 5000 BC have been excavated in Mexico and the Indus Valley Civilization in Indian subcontinent between 6000 BC and 5000 BC. Although cultivated since antiquity, it was the invention of the cotton gin that lowered the cost of

production that led to its widespread use, and it is the most widely used natural fibre cloth in clothing today.

Cotton textile industry has three sub-sectors i.e. handloom, powerloom and mill sectors. Handloom sector is labour-intensive and provides employment to semi-skilled workers. It requires small capital investment. Why did Mahatma Gandhi propagate Khadi as part of the independence movement? This sector involves spinning, weaving and finishing of the fabrics. The powerloom sector introduces machines and becomes less labour intensive and the volume of production increases. Cotton textile mill sector is highly capital intensive and produces fine clothes in bulk.

Cotton textile manufacturing requires good quality cotton as raw material. India, China, U.S.A, Pakistan, Uzbekistan, Egypt produce more than half of the world's raw cotton. The U.K, NW European countries and Japan also produce cotton textile made from imported yarn. Europe alone accounts for nearly half of the world's cotton imports. The industry has to face very stiff competition with synthetic fibres hence it has now shown a declining trend in many countries. With the scientific advancement and technological improvements the structure of industries changes. For example, Germany recorded constant growth in cotton textile industry since Second World War till the seventies but now it has declined. It has shifted to less developed countries where labour costs are low

Fig. No. 07 Cotton Processing at an Indian Spinning Mill

https://upload.wikimedia.org/wikipedia/commons/4/4d/CSIRO_ScienceImage_10736_Manually_decontaminating_cotton_before_processing_at_an_Indian_spinning_mill.jpg

Jute textiles

The jute products include gunny bags, canvas, pack sheets, jute webs, hessians, carpets, cordage and twines. In the present times, jute is also being used, in one form or the other, in plastic furniture, insulation, bleached fibres to blend with wool, and is being mixed with cotton to make carpets and blankets.

Fig.No 08 ; Jute textiles

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Silk Textiles

India has been famous for making silk fabrics in Bengal and Kashmir since centuries. Silk worms are reared mostly on the leaves of mulberry which the worms feed on. The rearing of silk worms is called Sericulture. This is a labour intensive industry. Karnataka accounts for two-thirds of our raw silk output. Jammu, Tamil Nadu, Andhra Pradesh are other major producers. India produces mulberry silk, and other varieties like Tasar, Eri and Muga.

(b) Mineral based Industries

These industries use minerals as a raw material for their production process. Some industries use ferrous metallic minerals which contain ferrous (iron), such as iron and steel industries but some use non-ferrous metallic minerals, such as aluminium, copper and jewellery industries. Many industries use non-metallic minerals such as cement and pottery industries.

Iron and Steel Industry

Iron and Steel Industry is termed as the key industry of India because it lays the foundation of developing other ancillary industries. The iron and steel industry forms the base of all

other industries and, therefore, it is called a basic industry. It is basic because it provides raw material for other industries such as machine tools used for further production. It may also be called a heavy industry because it uses large quantities of bulky raw materials and its products are also heavy.Iron is extracted from iron ore by smelting in a blast furnace with carbon (coke) and limestone. The molten iron is cooled and moulded to form pig iron which is used for converting into steel by adding strengthening materials like manganese. The large integrated steel industry is traditionally located close to the sources of raw materials â€“ iron ore, coal, manganese and limestone â€“ or at places where these could be easily brought, e.g. near ports. But in mini steel mills access to markets is more important than inputs. These are less expensive to build and operate and can be located near markets because of the abundance of scrap metal, which is the main input. Traditionally, most of the steel was produced at large integrated plants, but mini mills are limited to just one-step process - steelmaking - and are gaining ground.

Distribution

The industry is one of the most complex and capital-intensive industries and is concentrated in the advanced countries of North America, Europe and Asia. In U.S.A, most of the production comes from the north Appalachian region (Pittsburgh), Great Lake region (Chicago-Gary, Erie, Cleveland, Lorain, Buffalo and Duluth) and the Atlantic Coast (Sparrows Point and Morisville). The industry has also moved towards the southern state of Alabama. Pittsburg area is now losing ground. It has now become the rust bowl of U.S.A. In Europe, U.K., Germany, France, Belgium, Luxembourgh, the Netherlands and Russia are the leading producers. The important steel centres are Scun Thorpe, Port Talbot, Birmingham and Sheffield in the U.K.; Duisburg, Dortmund, Dusseldorf and Essen in Germany; Le Creusot and St. Ettienne in France; and Moscow, St. Petersburgh, Lipetsk, Tula, in Russia and Krivoi Rog, and Donetsk in Ukraine. In Asia, the important centres include Nagasaki and Tokyo-Yokohama in Japan; Shanghai, Tienstin and Wuhan in China; and Jamshedpur, Kulti-Burnpur, Durgapur, Rourkela, Bhilai, Bokaro, Salem, Visakhapatnam and Bhadravati in India. Consult your atlas to locate these places/centres.

Fig.No 09 Steel Industry , Brackenridge

https://upload.wikimedia.org/wikipedia/commons/a/a4/Allegheny_Ludlum_steel_furnace.jpg

Copper Smelting Industry

Next to tin and lead, the metal that was smelted appears to have been copper. The discovery of copper and bronze manufacture had a significant impact on the history of the Old World. These metals were hard enough to make weapons and were heavier, stronger, and more resistant to impact-related damage than their wood, bone, or stone equivalents. Copper extraction techniques refers to the methods for obtaining copper from its ores.

The conversion of copper consists of a series of chemical, physical, and electrochemical processes. Methods have evolved and vary from country to country depending on the ore source, local environmental regulations, and other factors.

Fig.No 10 Copper Smelter

https://upload.wikimedia.org/wikipedia/commons/0/09/Phoenix_copper_smelter.jp

(c) Chemical based Industries

Such industries use natural chemical minerals, e.g. mineral-oil (petroleum) is used in petro-chemical industry. Salts, sulphur and potash industries also use natural minerals. Chemical industries are also based on raw materials obtained from wood and coal. Synthetic fibre, plastic, etc. are other examples of chemical based industries.

Fig No.11 Fertilizer Industry

https://upload.wikimedia.org/wikipedia/en/8/88/NFL_Vijaipur_Unit.jpg

(d) Forest based Raw Material using Industries

The forests provide many major and minor products which are used as raw material. Timber for furniture industry, wood, bamboo and grass for paper industry, lac for lac industries come from forests.

The principal raw material used for paper, paper board and newsprint manufacture is cellulosic pulp. The industry requires small quantities of other materials like fillers, sizing materials and dyes. Coniferous wood, bamboo and grass are considered as ideal raw materials for the manufacture of paper pulp. Long fibre pulp with a high degree of flexibility and density is most suitable for paper manufacture.

Fig. No 12 Forest based Industry

https://upload.wikimedia.org/wikipedia/commons/b/be/The_fourth_year_of_a_genetically_modified_forest_in_Iran_by_Aras_GED_part_of_commercial_afforestation_in_Iran.jpg

(e) Animal based Industries

Some industries are based on the raw materials which are sourced from animals. Leather for leather industry and wool for woollen textiles are obtained from animals. Besides, ivory is also obtained from elephant's tusks which in the current times have been prohibited by many governments across the globe.

Fig. No 13 Dairy Farming

https://upload.wikimedia.org/wikipedia/commons/3/3f/Melkkarussell.jpg

Industries Based On Output/Product:

You have seen some machines and tools made of iron or steel. The raw material for such machines and tools is iron and steel. Which is itself an industry. The industry whose products are used to make other goods by using them as raw materials are basic industries.Can you identify the links? Iron/steel → machine foe textile industry → clothes for use by consumers

The consumer goods industries produced goods which are consumed by consumers directly. For example, industries producing breads and biscuits, tea, soaps and toiletries, paper for writing, televisions, etc. are consumer goods or non-basic industries.

Machine Tools Industry

A **machine tool** is a machine used for shaping or machining metal or other rigid materials, by cutting, boring, grinding, shearing, or other forms of deformation. Machine tools are used for cutting or shaping. All machine tools have some means of constraining the work piece and provide a guided movement of the parts of the machine. Thus the relative movement between the work piece and the cutting tool (which is called the **toolpath**) is controlled or

constrained by the machine to at least some extent, rather than being entirely "offhand" or "freehand".

Automobile Industry

The **automobile industry** is a wide range of companies and organizations involved in the design, development, manufacturing, marketing, and selling of motor vehicles. It is one of the world's most important economic sectors by revenue. The automotive industry does not include industries dedicated to the maintenance of automobiles following delivery to the end-user, such as automobile repair shops and motor fuel filling stations.

Industries Based on Ownership

Since the start of the planned development of Indian economy in 1951, industries are divided in the following four classes:

(a) **Public Sector Industries**:

Public Sector Industries are owned and managed by governments. In India, there were a number of Public Sector Undertakings (PSUs). Socialist countries have many state owned industries. Mixed economies have both Public and Private sector enterprises. Industries owned by the state and its agencies like Bharat Heavy Electricals Ltd., or Bhilai Steel Plant or Durgapur Steel Plant are public sector industries.

(b) **Private Sector Industries:**

Private Sector Industries are owned by individual investors. These are managed by private organizations. In capitalist countries, industries are generally owned privately. Industries owned by individuals or firms such as Bajaj Auto or TISCO situated at Jamshedpur are examples of private sector industries.

(c) Joint Sector Industries:

Joint Sector Industries are managed by joint stock companies or sometimes the private and public sectors together establish and manage the industries. Industries owned jointly by the private firms and the state or its agencies such as Gujarat Alkalies Ltd., or Oil India Ltd. fall in the group of joint sector industries.

4. Co-operative Sector Industries:

Industries owned and run co-operatively by a group of people who are generally producers of raw materials of the given industry such as a sugar mill owned and run by farmers are

called co-operative sector industries. Amul Cooperative in Gujarat is popular for having local milkmen as stakeholders of the business.

Industries based on Ownership

a) Public Sector Industries are owned and managed by governments. In India, there were a number of Public Sector Undertakings (PSUs). Socialist countries have many state owned industries. Mixed economies have both Public and Private sector enterprises.
b) Private Sector Industries are owned by individual investors. These are managed by private organisations. In capitalist countries, industries are generally owned privately.
c) Joint Sector Industries are managed by joint stock companies or sometimes the private and public sectors together establish and manage the industries. Can you make a list of such industries?

Traditional Large-Scale Industrial Regions

These are based on heavy industry, often located near coal-fields and engaged in metal smelting, heavy engineering, chemical manufacture or textile production. These industries are now known as smokestack industries. Traditional industrial regions can be recognised by:

- High proportion of employment in manufacturing industry. High-density housing, often of inferior type, and poor services. Unattractive environment, for example, pollution, waste heaps, and so on.
- Problems of unemployment, emigration and derelict land areas caused by closure of factories because of a worldwide fall in demand.

The Ruhr Coal-field, Germany

This has been one of the major industrial regions of Europe for a long time. Coal and iron and steel formed the basis of the economy, but as the demand for coal declined, the industry started shrinking. Even after the iron ore was exhausted, the industry remained, using imported ore brought by waterways to the Ruhr.

The Ruhr region is responsible for 80 per cent of Germanyâ€™s total steel production. Changes in the industrial structure have led to the decay of some areas, and there are problems of industrial waste and pollution. The future prosperity of the Ruhr is based less on the products of coal and steel, for which it was initially famous, and more on the new

industries like the huge Opel car assembly plant, new chemical plants, universities. Out-of-town shopping centres have appeared resulting in a â€˜New Ruhrâ€™ landscape.

Concept of High Technology Industry

High technology, or simply high-tech, is the latest generation of manufacturing activities. It is best understood as the application of intensive research and development (R and D) efforts leading to the manufacture of products of an advanced scientific and engineering character. Professional (white collar) workers make up a large share of the total workforce. These highly skilled specialists greatly outnumber the actual production (blue collar) workers. Robotics on the assembly line, computer-aided design (CAD) and manufacturing, electronic controls of smelting and refining processes, and the constant development of new chemical and pharmaceutical products are notable examples of a high-tech industry.

Neatly spaced, low, modern, dispersed, office-plant-lab buildings rather than massive assembly structures, factories and storage areas mark the high-tech industrial landscape. Planned business parks for high-tech start-ups have become part of regional and local development schemes.

High-tech industries which are regionally concentrated, self-sustained and highly specialised are called technopolies. The Silicon Valley near San Francisco and Silicon Forest near Seattle are examples of technopolies. Are some technologies developing in India?

Manufacturing contributes significantly to the world economy. Iron and steel, textiles, automobiles, petrochemicals and electronics are some of the world’s most important manufacturing industries.