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MANUFACTURING INDUSTRIES

[Harish example]

»» Production of goods in large quantities after processing from raw materials to more valuable products is called manufacturing.

[Raw materials → Valuable products
large quantity production ⇒ MANUFACTURING]

Eg - Wood → Paper
Sugarcane → Sugar
Iron ore → Iron and Steel
Bauxite → Aluminium
Yarn → clothes

»» Workers are employed for these secondary activities.

»» Economic strength of a country ⟹ (measured by) Development of manufacturing industri

IMPORTANCE OF MANUFACTURING

(backbone of development)

1. • Modernise agriculture (major backbone of India)
   • Reduce dependence on agriculture
   ↓
   provides jobs in secondary & tertiary sectors

2. • Reduce poverty and unemployment
• Brings down regional disparities
↓
establish industries in tribal, backward areas

3. • Export of goods
↓ ↓
expands trade & commerce
brings foreign exchange } much needed

4. • Prosperous Countries = Countries that transform raw materials to variety of finished goods.

• ∴ India's prosperity lies in it.

Importance of Manufacturing SUMMARIZED

IMP
1. Modernise agriculture
2. Provide secondary, tertiary jobs
3. Reduce poverty, unemployment
4. Lowers disparities (establishing in tribal areas)
5. Exports
6. Expands trade and commerce
7. Bring foreign exchange
8. Brings prosperity.

Agriculture and industries move hand-in-hand.

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Agro-industries

»» boost to agriculture, rise in productivity

»» raw materials → products

for farmers:
- irrigation pumps
- fertilizers
- insecticides
- pesticides
- plastic / PVC pipes
- machines
- tools, etc.

»» Industry + Agriculture
= increased and efficient production

What's needed in present world (Globalised)
- Self-sufficiency (not enough)
- Efficiency
- Competitiveness
- Good quality goods (international market)

(Efficiency, Competitiveness: also needed)

IMP

CLASSIFICATION OF INDUSTRIES

① On the basis of source of raw materials

- Agro-based: cotton, wool, jute, silk, oil, rubber, sugar, tea, coffee.
- Mineral-based: iron and steel, cement, aluminium, machines, tools, petrochemicals.

② According to main role

Basic or Key industries
» supply raw materials to manufacture other goods

» Eg - SMELTING (iron, steel, copper, aluminium)

Consumer industries
» produce goods for direct use by consumers

» Eg - Sugar
- toothpastes
- sewing machi
- fans

③ On the basis of capital investment

Small-scale industries
» maximum capital investment of ₹ 1 Cr (or less)

Large-scale industries
» maximum capital investment of more than ₹ 1 Cr
(or - more than ₹ 10 Cr if we take MEDIUM industries)

④ On the basis of bulk and weight

Heavy industries
» heavy raw materials and heavy goods
» Eg - iron & steel

Light industries
» light raw materials and light goods
» Eg - electrical goods

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⑤ On the basis of ownership

Operated & owned by:-	Public	Private	Joint	Cooperative
	govt. agencies	individuals or group of them	govt. and individuals	producers / suppliers / workers
Examples:-	• BHEL • SAIL	• TISCO • Bajaj Auto • Dabur	• OIL	• Sugar (Maharashtra) • Coir (Kerala)

Cooperative:
- pool resources
- share profits (& losses)
- operated by a group of producers or a group of workers or both

Agro-based Industries

- Based on agricultural raw materials (cotton, jute, silk, wool, sugar, oil, etc.)

Textile industry

- Contributes to production, employment and foreign exchange
- The only self-reliant industry, complete in value chain

Cotton Textiles

- Ancient India: production with hand spinning and handloom weaving techniques.
- After 18th century: Usage of power-looms

» Setback during colonial period (for Ind. traditional industries)
↳ could not compete with mill-made cloth from England

» First textile mill – Mumbai – 1854
⇓ Why was it established?
Demand for cloth in UK during World Wars.

» Cotton in early years – concentrated in the cotton growing belt of Maharashtra & Gujarat.
↓ Why?
- Availability of:
  - raw cotton
  - market
  - transport (including ports)
  - labour
  - moist climate, etc. [in MH & GJ]

FEATURES

» Cotton industry ~~creates~~ creates employment:
- farmers
- cotton ball pluckers
- workers – ginning – designing
  – spinning – packaging
  – weaving – tailoring
  – dyeing – sewing

Handspun Khadi provides large scale employment to weavers. (as cottage industry)

» Supports other industries:
- chemicals and dyes
- packaging materials
- engineering works

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Spinning	Weaving
• centralised • - Maharashtra - Gujarat - Tamil Nadu	• decentralised • scope for traditional skills and designs (cotton, silk, zari, embroidery, etc.)
• India has world-class production in spinning, with good quality	• Weaving doesn't use high quality yarn, therefore, results in low quality of fabric produced.

Jute Textiles

»» India's stand on jute industry:
- Largest producer of raw jute & jute goods
- Second largest exporter after Bangladesh

»» Most jute mills: West Bengal
(mainly near Hugli river)

First jute mill – Rishra – 1855
(near Kolkata)

After Partition (1947) – 3/4th of jute producing area went to Bangladesh

IMP

Why are jute mills in Hugli basin?
- proximity of jute producing areas
- inexpensive water transport
- good railway network
- good road ways and waterways } movement of raw materials to mills
- abundant water (for processing raw jute)
- cheap labour (from W. Bengal, Odisha, UP)

Sugar Industry — seasonal, suitable for COOPERATIVES

» India:
- Second largest producer of sugar
- Largest producer of gur and Khandsari

» Bulky raw material, ~~Sucro~~-

» Sucrose reduces in haulage (transport)

» Major mills:
- Uttar Pradesh } 60% mills
- Bihar }
- Maharashtra
- Karnataka
- Tamil Nadu
- Andhra Pradesh } other 40% mills
- Gujarat
- Punjab
- Haryana
- Madhya Pradesh

Mills shift to South and West states, esp. Maharashtra
↓ Why?
- more sucrose in cane
- cool climate
- success of cooperatives

Mineral-based Industries

Iron and Steel Industry

» Basic industry (all other industries are dependent on it)
↳ Steel needed to manufacture:
- engineering goods
- construction material
- consumer goods
- equipment (defence, medical, telephonic, scientific)

Production & Consumption of STEEL is an index of country's development

>>>

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Heavy industry

- heavy/bulky raw material & finished goods
- heavy transportation costs

Steel Production (blast furnace)

Iron ore : Coking coal : lime stone

⇓

4 : 2 : 1 (respectively)

» Manganese is required to HARDEN steel.

[Fig 6.2] Process of manufacture of steel

» Major Industries → **Chhotanagpur plateau**

- maximum concentration of iron and steel industries

↓ Why?

- low cost of iron ore
- high grade raw materials in proximity
- cheap labour
- vast growth potential (home market)

Steel Plants (MAP)	
• Durgapur	• Vishakhapatnam
Burnpur	• Vijayanagar
Bokaro	• Bhadravati
Jamshedpur	• Salem
Rourkela	
Bhilai	

Aluminium Smelting

» 2nd most important metallurgical industry

» Properties of aluminium

- light in weight
- resistant to corrosion
- good conductor of heat
- malleable
- stronger when mixed with other metals

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» Uses of aluminium:
- manufacturing aircraft, utensils, wires
- substitute of steel, copper, zinc, lead in many industries

» Major plants:
- Odisha
- West Bengal
- Kerala
- Uttar Pradesh
- Chhattisgarh
- Maharashtra
- Tamil Nadu

» Bauxite – bulky, dark reddish coloured rock used as raw material

» Factors determining location:
1. Regular supply of electricity
2. Assured source of raw material at low cost

» Process of manufacturing:
[Fig 6.4] → 4-6 tonnes Bauxite → 2 tonnes Alumina → 1 tonne Aluminium
[Fig 6.5 full process]

Chemical Industries

» Both large and small scale manufacturing units
» Rapid growth in both organic & inorganic sector

» Inorganic chemicals:
- sulphuric acid → (manufacture fertilisers, synthetic fibres, plastics, adhesives, paints, dyes stuffs)
- nitric acid
- alkalis
- soda ash → (make glass, soaps, detergents, paper)
- caustic soda

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>>> Organic chemicals:
- petrochemicals (manufacturing synthetic fibres, synthetic rubber, plastics, dye-stuffs, drugs, pharmaceuticals)

⇩

>>> Location (organic chemical plants):
near oil refineries or petrochemical plants

>>> Chemical industry is its own largest consumer.

↓

Chemicals undergo processing to form other chemicals used for industries, agriculture or direct consumer markets

Fertilizer Industry

>>> Production of:
1. Nitrogenous fertilisers (mainly urea)
2. Phosphatic fertilizers & ammonium phosphate (DAP)
3. Complex fertilizers [combination of nitrogen (N), phospate (P) and potash (K)]

entirely imported
∵ no reserves present

>>> Green Revolution → EXPANSION

>>> Major Producers:
- Gujarat
- Tamil Nadu
- Uttar Pradesh
- Punjab
- Kerala

⇩

half of the total fertilizer production

Other Producers:
- Andhra Pradesh
- Odisha
- Rajasthan
- Bihar
- Maharashtra
- Assam
- West Bengal
- Goa
- Delhi
- Madhya Pradesh
- Karnataka

Cement Industry

» Cement is used for construction of houses, factories, bridges, roads, airports, dams, other commercial establishments

» Bulky, Heavy raw materials - limestone, silica, gypsum

» Needed - coal
electric power
rail transportation

» Location:
- Gujarat
(access to markets in Gulf countries)

» First cement plant - Chennai - 1904

Automobile Industry

» Automobiles provide quick transport (goods, people)

» What is manufactured in India?

- Trucks
- Cars
- Scooters
- multi-utility vehicles
- Buses
- Motocycles
- three-wheelers

» Liberalisation → new, contemporary models → demand of vehicles in market → GROWTH (of industry)

» Major Locations:

- Delhi
- Gurugram
- Mumbai
- Pune
- Chennai
- Kolkata
- Lucknow
- Indore
- Hyderabad
- Jamshedpur
- Bengaluru

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Information Technology and Electronics Industry

» Electronics Industry - various products:

- Transistor sets
- Television
- Cellular telecom
- Telephone exchange
- Telephone
- Radars
- Computers
- Other equipments for telecommunication

» Important centres:

- Bengaluru → (electronic capital of India)
- Noida
- Mumbai
- Chennai
- Hyderabad
- Pune

↓

Major concentration of industry

Other Locations:

- Delhi
- Kolkata
- Lucknow
- Coimbatore

} not so Imp

» Reasons for SUCCESS:

1. Employment generation
2. Growth in hardware and Software

Industrial Pollution and Environmental Degradation

» Industries are important for economic growth and development.

» But they ~~contr~~ are responsible for four types of pollution.

1. Air Pollution
- high proportion of undesirable gases (SO_2, CO, etc)
- air-borne particulate materials (dust, spray mist, smoke)
- Smoke emitted by chemical/paper factories, brick kilns, refineries, smelting plants and burning of fossil fuels
- Toxic gas leaks
- Example - Bhopal Gas Tragedy
- Affects humans, animals, plants, buildings and atmosphere

2. Water Pollution
- Organic/inorganic industrial wastes, affluents
- Paper, pulp, chemical, textile, petroleum refineries, tanneries, electroplating industry
  ↓ let out
  dyes, detergents, acids, salts, heavy metals (lead, mercury), pesticides, fertilizers, synthetic chemicals, plastic, rubber, etc.
- Major solid wastes - Fly-ash, phospo-gypsum and iron and steel slags

3 Thermal Pollution
- hot water from factories/thermal plants is
- drained into water bodies
  Affects aquatic life
- Wastes from nuclear power plants, weapon production facilities
  ↓
- Effects on humans - cancers, birth defects, miscarriages
- Causes soil and water pollution (dumping waste)
- Makes soil useless, rainwater → percolates → carries pollutants to ground → groundwater gets contaminated

4. Noise Pollution

»» Short term - irritation, anger, stress

»» Long term/excessive [redacted] - hearing impairment, increased heart rate and blood pressure, other physiological effects.

»» Industries, construction activities, machinery, factory equipment, generators, saws, drills make lot of noise.

Control of Environmental Degradation

»» Waste = 8 times the freshwater

»» Methods to reduce water Pollution:

1. Minimising water usage for processing
2. Reusing and recycling water
3. Rainwater harvesting
4. Treating hot water and effluents before releasing in water:

↓ How?

(a) Primary treatment - mechanical means - screening, grinding, flocculation, sedimentation

(b) Secondary treatment - biological processes

(c) Tertiary treatment - biological, chemical, physical processes - recycling waste water

5. Regulating overdrawing of groundwater reserves (laws)

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»» Methods to reduce air pollution:

1. Reducing particulate matter in air
   ↓ by
   fitting smoke stacks to factories with electrostatic precipitators, fabric filters, scrubbers, inertial separators
   (smoke is a part of particulate matter)
2. Reducing smoke → using oil and gas instead of coal

»» Methods to reduce noise pollution:

1. Redesigning machinery to increase energy efficiency and reduce noise
2. Using noise absorbing materials
3. Using earplugs and earphones (with low sound)

NTPC

»» major power providing corporation in India
»» has ISO certification for EMS 14001
»» proactive approach for preserving environment

1. Using equipment with latest techniques
   (and upgrading existing equipment)
2. Maximum ash utilization → minimum waste generation
3. Providing green belts (ecological balance)
4. Special-purpose vehicles for afforestation
5. Ash pond management, ash water recycling system, liquid waste management
6. Ecological monitoring, reviews and online database for power stations