DISTRIBUTION OF IRON ORE IN INDIA

RESOURCE GEOGRAPHY

DSE 3

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INTRODUCTION

- Iron ore is the most important mineral that is used to extract metallic Iron by Iron and Steel Industry. Extracted metal is widely used by secondary industries for manufacturing of machines, machine tools, construction of buildings etc.
- It is the most widely used metal because of its certain qualities like hardness, strength and durability. Further, iron is malleable and possess magnetic properties. Hence, Iron, because of its significance in manufacturing and development of infrastructure has wide economic importance.

IRON ORE DISTRIBUTION: WORLD AND INDIA

The iron ore is found in following four types:

- **Magnetite**: It is the most important and best kind of iron ore. It contains about 72 percent metallic iron in it. It is black in colour.
- **Hematite**: It is also an important source. It contains about 60-70 percent metallic iron in it. It is red and brown in colour.
- **Limonite**: It contains about 30 to 40 percent metallic iron in it. It is mostly yellow in colour. It is a low-grade iron ore.
- **Siderite**: It has more impurities. It contains about 48 percent metallic iron content in it. It is brown in colour. It contains a mixture of iron and carbon. It is a low-grade iron ore.

DISTRIBUTION OF IRON ORE IN INDIA

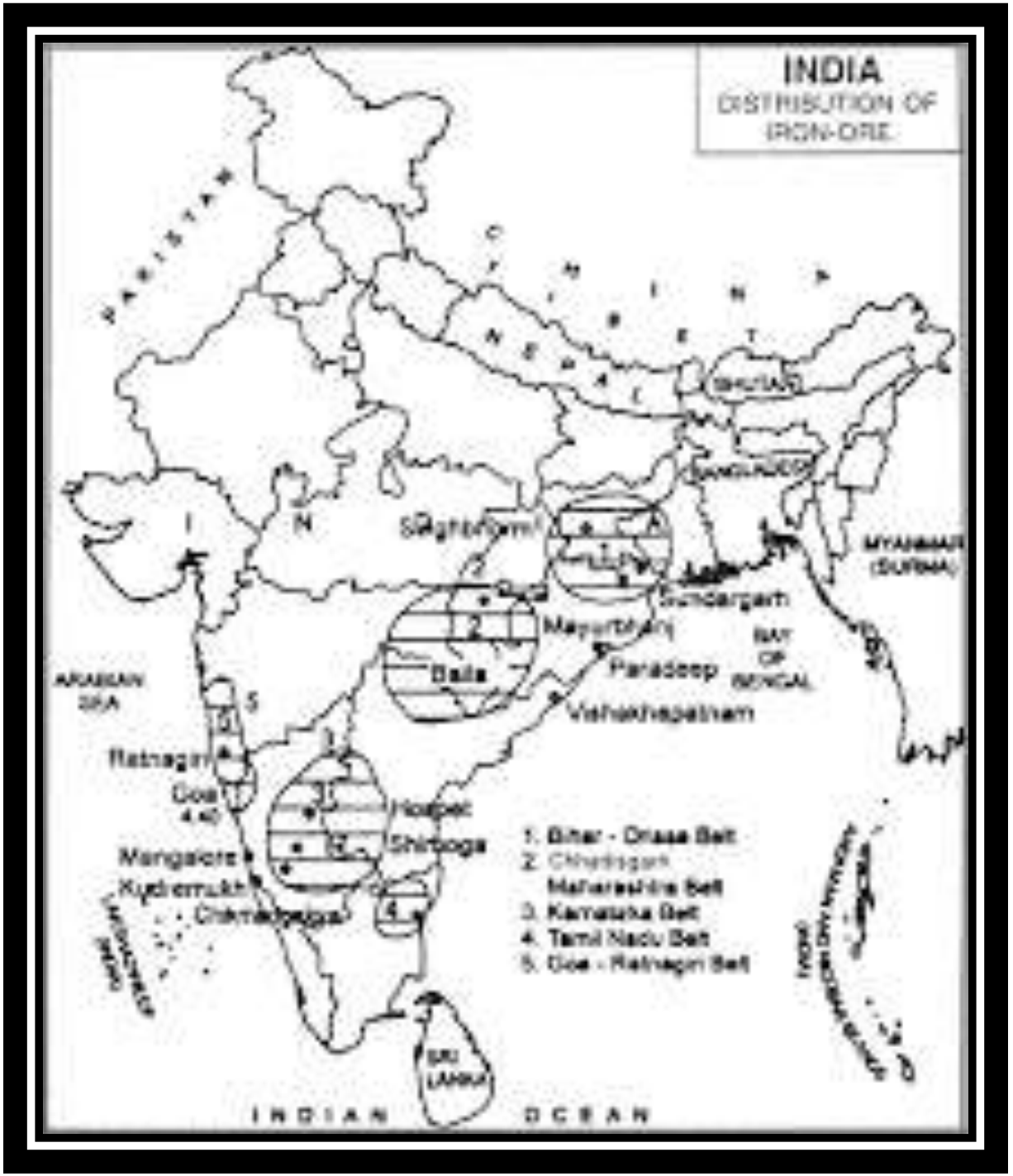
- India is one of the richest countries of the world in iron ore deposits, particularly the hematite ore. According to the latest Indian Year Book, 95 percent of the hematite resources are distributed in Odisha, Jharkhand, Karnataka and Goa.
- Magnetite resources are estimated at around 10,619 million tons out of which only 59 million tons is situated mainly in Goa, Rajasthan and Jharkhand. The rest 10,560 million tons or the 99 percent of the magnetite resource is in 'Remaining Resources' category which is mainly found in Karnataka (74 percent) and Andhra Pradesh (14 percent).

Iron Ore reserves (in descending order)

- Karnataka
- Odisha
- Jharkhand
- Chhattisgarh

Iron Ore production (in descending order)

- Odisha
- Goa
- Karnataka
- Chhattisgarh


INDIA
DISTRIBUTION OF
IRON-ORE
PAKISTAN
CHINA
NEPAL
BHUTAN
BANGLADESH
MYANMAR
(BURMA)
Singhbhum
Sundargarh
Mayurbhanj
Bolla
Paradeep
BAY
OF
BENGAL
Vishakhapatnam
ARABIAN
SEA
Ratnagiri
Goa
Hospet
Shimoga
Mangalore
Kudremukh
Chikmagalur
1. Bihar - Orissa Belt
2. Chhattisgarh
Maharashtra Belt
3. Karnataka Belt
4. Tamil Nadu Belt
5. Goa - Ratnagiri Belt
SRI
LANKA
INDIAN
OCEAN


INDIA
Iron Ore
Kangra
Mahendragarh
Alwar
Jaipur
Dhanbad
Singhbhum
Mandla
Bailghat
Bilaspur
Mayurbanj
Keonjhar
Chandrapur
Dorli
Khammam
Guntur
Ratnagiri
Anantapur
Goa
Nellore
Bellary
Kemmangundi
Hospet
Kudremukh
Salem
Kozhikode
Madurai
IRON ORE
0 200 400 Km

- **Jharkhand**
- The iron ores here exist as hill masses which are close to coal fields. The iron ore generally occurs at the top of the hills, iron ore mining companies use aerial ropeways for bringing down the ore and pumping it into the railway wagons standing near the foot of the hills. The major iron ore mining areas in Jharkhand are Noamudi, Gua, Jamda and Kiriburu.
- **Chhattisgarh**
- Exploitable rich iron deposits are located in Dalli-Rajhara region of Durg district (close to Bhilai Steel Works), Bailadilla region of Dantewada district, Arindogi region and Raoghat region.

- **Bailadila mine** is the largest mechanised mine in Asia [Ore benefication only done here]
- A 270 km long slurry (a semi-liquid mixture) pipeline from the Bailadila to Vizag plant transports the ore slurry.
- Smelting is done in Vizag [Vishakhapatnam] iron and steel factory.
- Bailadila's high grade ore is exported through Vishakhapatnam to **Japan** [No iron ore in Japan. But market is huge due to **automobile industry**] and other countries.
- The **Dalli-Rajhara** range is 32 km long [ferrous content 68-69 per cent] range with significant reserves.

- **Odisha**
- The major iron ore mining centre is in Singhbhum district. The districts of Keonjhar, Mayurbhanj and Sundargarh also form the richest reserves of quality iron ore. The iron ore available here is Hematite which has about 60-70 percent metallic iron content. The iron ore from these sites is supplied to the iron and steel factories located at Rourkela, Jamshedpur, Asansol and Durgapur. The ore is also exported to different countries through the Paradip port.
- **Goa**
- The major iron ore mining centres are Sanguem, Safari, Ponda, Sahqualim, Bicholim and Quepem. The iron ore found in Goa is of high quality. The mining centres are located close to the port of Marmagao. The mines are worked by open-cast methods. They are close to rivers which enter the sea near the port. The iron ore is brought by road to jetties on the navigable rivers from which it is taken away to port for onward journey.

- **Karnataka**
- In Karnataka, the major iron ore mining areas are Baba Budan Hills, Kudremukh region, Hospet, Bellary, Chitradurga and Tumkur district. Iron-ore mined in Bellary and Hospet area is transported to Hospet from where it is sent to the ports of Chennai and Marmagao through railways for export to other countries.
- **Maharashtra**
- Maharashtra produces a very small amount of iron ore. Major mining ore areas include Chandrapur, Ratnagiri and Bhandara districts.
- **Andhra Pradesh**
- Iron ore is mined in small quantities in districts of Karimnagar, Warangal, Cuddapah, Kurnool, Adilabad and Anantapur.
- **Tamil Nadu**
- In Tamil Nadu, the areas where iron ore is mined are Tirthamalai Hills in Salem district and Yadpalli and Killiomalai areas in Nilgiris.

IRON ORE IN OTHER STATES

- Andhra Pradesh (1.02%): Kurnool, Guntur, Cuddapah, Ananthapur, Nellore.
- Maharashtra (0.88%): Chandrapur, Ratnagiri and Sindhudurg.
- Madhya Pradesh (0.66%).
- Tamilnadu: Salem, Tiruchirapalli, Coimbatore, Madurai etc.
- Rajasthan: Jaipur, Alwar, Sikar, Bundi, Bhilwara.
- Uttar Pradesh: Mirzapur.
- Uttaranchal: Garhwal, Almora, Nainital.
- Himachal Pradesh: Kangra and Mandi.
- Haryana: Mahendragarh.
- West Bengal: Burdwan, Birbhum, Darjeeling.
- Jammu and Kashmir: Udhampur and Jammu.
- Gujarat: Bhavnagar, Junagadh, Vadodara.
- Kerala: Kozhikode.

EXPORTS:

- India is the fifth largest exporter of iron ore in the world. We export about 50 to 60 per cent of our total iron ore production to countries like Japan, Korea, European countries and lately to Gulf countries. Japan is the biggest buyer of Indian iron ore accounting for about three-fourths of our total exports. Major ports handling iron ore export are Vishakhapatnam, Paradip, Marmagao and Mangalore.
- Efforts are being made to increase the production so that sufficient quantity of iron ore is available for export after meeting the requirements of the expanding home market. Export of iron ore is necessary for earning the much needed foreign exchange.

USES OF IRON ORE

- The primary use of iron ore in India is for steel production, which accounts for about 98% of all mined iron ore. This steel is essential for infrastructure development (buildings, bridges, roads), the automotive industry, manufacturing machinery and equipment, and producing household goods. Other uses include making pig iron and sponge iron, and in the production of various pigments and in some medicine.

PRIMARY USES OF IRON

- **Steel Production:** The most significant use, with iron ore being the key raw material for producing pig iron, sponge iron, and eventually steel.
- **Construction:** Steel derived from iron ore is crucial for building structures like buildings, bridges, and roads.
- **Automotive Industry:** It is a main component for manufacturing cars and other vehicles.
- **Machinery and Equipment:** Used to produce a wide range of machinery for agriculture, construction, and mining.
- **Household Goods:** Steel from iron ore is used in appliances, cookware, and furniture.

OTHER USES

- **Pig Iron and Sponge Iron:**

Iron ore is used to produce pig iron and sponge iron, which are then processed into steel.

- **Pigments:**

Hematite is used to create pigments like red ochre for paints and dyes.

- **Medicine and Research:**

Certain forms of iron ore, like radioactive iron and black iron oxide, have applications in medicine and metallurgical research.

- **Magnets:**

Magnetic iron ore (magnetite) is used in making magnets and other magnetic applications.

- **Export:**

India exports iron ore to other countries, which helps in earning foreign exchange.

PROBLEMS OF IRON ORE IN INDIA

- Problems related to India's iron ore industry include environmental damage from mining, logistical and infrastructure challenges, regulatory hurdles like delays in forest clearances, and issues with the quality and processing of the ore, such as the underutilization of fines. The industry also faces economic challenges like higher production costs and price fluctuations due to global competition, a lack of modern technology, and a shortage of high-grade coking coal.

ENVIRONMENTAL AND SOCIAL ISSUES

- **Ecological damage:**
- Mining causes deforestation, soil erosion, loss of biodiversity, and water pollution from tailings (waste materials).
- **Air and water pollution:**
- Tailings disposal can lead to air pollution, and chemical contamination of water bodies is a concern.
- **Resource depletion:**
- Over-exploitation of high-quality ore is depleting finite resources, forcing mining deeper into less accessible, lower-grade deposits.
- **Community displacement:**
- Mining operations can displace local communities, and there are often issues with compensation and community involvement.

LOGISTICAL AND INFRASTRUCTURAL PROBLEMS

- **Poor infrastructure:**
- Lack of adequate rail and road connectivity from mines to ports hinders efficient transportation.
- **Regulatory delays:**
- Delays in obtaining regulatory approvals, such as forest clearances, are a significant challenge.
- **Financial constraints:**
- A lack of adequate financial resources can hamper modernization and expansion.

ORE AND PROCESSING CHALLENGES

- **Ore quality and processing:**
- Some iron ore deposits, like those in Goa and Karnataka, are friable and difficult to process.
- **Underutilization of fines:**
- A large portion of the ore generated is in the form of fines, which are often left unutilized but can be processed through agglomeration technologies like pelletization.
- **Coking coal shortage:**
- India has a limited supply of high-grade coking coal, which is essential for smelting iron.

ECONOMIC AND MARKET CHALLENGES

- **High production costs:**
- Costs are increased by inefficient operations, a lack of modern technology, and various duties and cesses.
- **Global competition:**
- India faces intense competition from countries like Brazil and China, which have more efficient and technologically advanced operations.
- **Price fluctuations:**
- The industry is subject to price volatility driven by shifts in global demand.

OTHER ISSUES

- **Low productivity:** Labour productivity in the iron and steel sector is among the lowest in the world.
- **Inefficient public sector units:** Many public sector units struggle with inefficiency, underutilization of capacity, and poor management.