India Exploration: Past and Future

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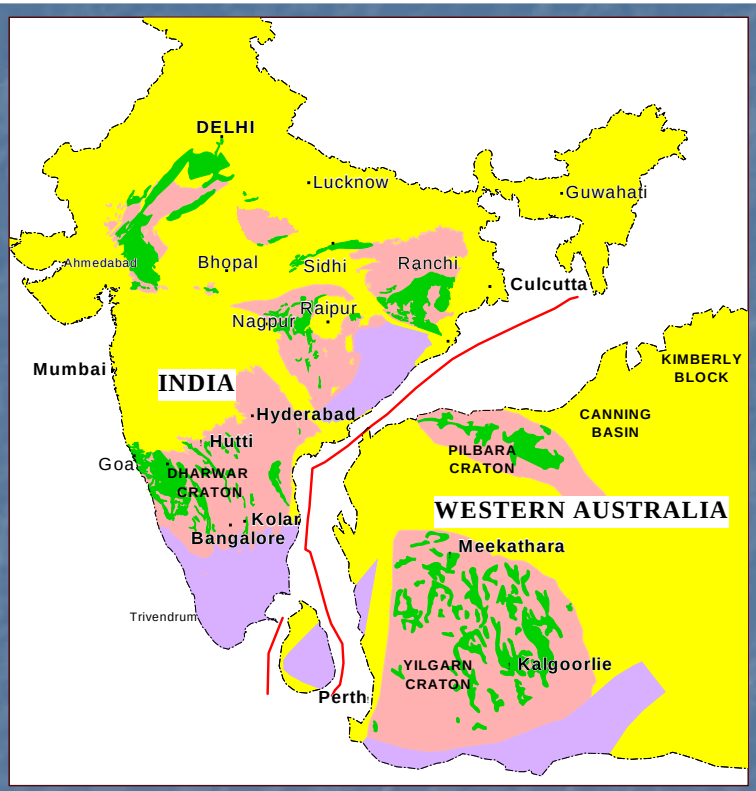
Mineral potential of India



- India is a country rich in mineral resources
- India is composed of large Precambrian terrain, comparable to Australia, Africa and Canada, known repository for gold, nickel, PGE and base metals
- About 2.42 m. Sq.Km of hard rock area is a available as potential exploration ground *(source GSI)*
- Work carried out by Govt. organizations like GSI, has identified several potential mineralized belts within this vast Precambrian terrain

- Gold mineralization has been identified in Archaean – Proterozoic belts of Jonnagiri, Chitradurga, Attappadi, Kotri, Kunderkocha, Mahakoshal and Sakoli
- New diamond bearing kimberlites are found in Raipur district of Chattisgarh
- Several basemetal occurrences have been identified in Aravalli of Rajasthan

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- India is host to the world renowned Kolar Gold Fields, which produced 900 t of gold (between 1881 to 2001)

- It also hosts world class Zinc, Lead and Silver deposit (Agucha) and Cu-Au deposit (Malanjkhand)

- It ranks high in world production of many minerals

Mica: 1st
Baryte : 2nd
Chromite: 3rd
Coal, Lignite, Talc, Steatite and pyrophyllite: 5th
Iron ore, Bauxite and Manganese : 5th, 6th and 7th

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- In spite of high geological potential not many mineable base and precious metal deposits have been identified in India during the past few decades

- The main reasons are

1. Until the opening up of Indian Mining Industry to FDI and Private investment in 1993, exploration for these metals was carried out mainly by government agencies (GSI, MECL etc.,) with limited budgets (US$5 m/annum) and lack of access and usage of world class technology.

2. After 1993, whilst a number of companies (267) applied for R.P.'s covering 368,916 sq.km for gold, copper, lead, zinc and diamonds, only few companies survived due to lack of investor friendly regulatory regime and lengthy delays in the issue of licenses.

3. Intense bureaucracy, red tapism caused severe implementation problems

A snap shot of bureaucratic delays

→ 1 to 5 days → 6 to 10 days
→ 11 to 15 days → 16 to 20 days
→ Above 20 days

Day one: Filing of application for PL at the Despatch Section of the Dept of Mines and Geology in Karnataka and in the office of the District Mining Officer or Assistant Director in other States → Section clerk → Draftsman → Asst. Draftsman → Draftsman → Suptd of the PL section → Deputy Director → Director → **(Revenue Authority)** Deputy Commissioner of the concerned district or Revenue Officer in other States (like MRO in AP) → Tahasildar → Revenue Inspector at the village level → Village Accountant → back to Tahasildar → Asst. Commissioner → Section Officer and one or two clerks in DC's office → Deputy Commissioner → **(Forest Authority)** District Forest Officer → Range Forest Officer → Assistant Conservator of Forests → Deputy Chief Conservator of Forests → Principal Chief Conservator of Forests (may take up to one year to send clearance to the Director, DMG) → Director of Mines and Geology → Additional Director (Minerals) → Suptd of the PL section → Concerned clerk → back to Suptd. → Deputy Director → Director for approval signature → back to Section clerk →

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Despatch clerk → Under Secretary to State Govt. → Section Suptd. → Concerned Clerk → Deputy Secretary → Principal Secretary to Govt for approval → Concerned Minister → Pvt Secretary → Back to Principal Secretary → Under Secretary → Section Suptd. → Concerned clerk → Despatch clerk → to Govt of India for Approval (Here also the file moves from table to table but faster) → back to the Secretary to State Govt → Under Secretary → Section Clerk → Despatch clerk → Despatch clerk at the DMG Office → Suptd. PL Section → Concerned Clerk → Draftsman → Asst. Draftsman for preparing copies of the PL sketch → back to Draftsman → Suptd. of PL Section → Concerned Clerk → Suptd. → Deputy Director → Director → **Issue of Notification to the PL applicant** → Applicant approaches the PL Section Suptd. → Section clerk → payment of PL fee and Security deposit at the Treasury → back to Suptd. of PL Section → Clerk → Suptd. → Draftsman for preparation copies of sketches → Suptd → Clerk → Suptd → Deputy Director → Director for execution of PL Deed → Deputy Director → back to the Suptd → Clerk → Issue of the Deed copies to the Applicant → Sub Registrar's Office at the concerned Tahasil office for Registration (Here 2 clerks + 1 despatch clerk are involved).

Exploration In India

Can be divided into 4 periods

- ✓Ancient and Historic Period
- ✓British Period
- ✓Post-Independence Period (1947-1993)
- ✓Post-Liberalization Period (after 1993)

Ancient and Historic Period

✓Extensive exploration and mining for gold and base metals was undertaken in Ancient India, namely Kolar, Jonnagairi, Agucha, Rajpura – Dariba etc.,

✓About 800 old mine sites for gold and base metals recorded in India

✓The old working sites are mainly in Precambrian Rocks and spread over Karnataka, Tamil Nadu, Andhra Pradesh, Maharastra, Jharkhand and Chattisgarh

✓Zinc smelting was successfully carried out as early as 1000 AD

British Period

- Many of the old mines, like Kolar Gold field, Hutti, Ramagiri etc were reopened
- Over 100 working mines were reported during British Period
- Kolar Gold Field was in its peak production
- Between 1881 to 1956 KGF produced 750 tons of gold at an average grade of 16 gm/t and provided employment for more than 4000 workers. The mine went down to a depth of 3 km

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Post-Independence Period

1. Nationalization of the gold mining in 1952 and coal mining industry in 1972

2. Industry protected from foreign competition by raising tariff walls – development of vested interests leading to high cost, low efficiency economy

3. Exploration by Government Agencies like GSI, MECL etc., with restricted budgets

4. Exploration methodology in India was not keeping pace with technological advances and international practices

5. No private investments were allowed in the industry, in particular in the base metal and precious metal industry

6. Not many mineral discoveries, except Agucha Zinc-Lead deposit, Malanjkhand Cu-Au deposit, Khetri copper deposit, Majhgawan Diamond deposit and few gold prospects in various greenstone belts in Karnataka, Andhra Pradesh, Madhya Pradesh, Rajasthan and Chattisgarh

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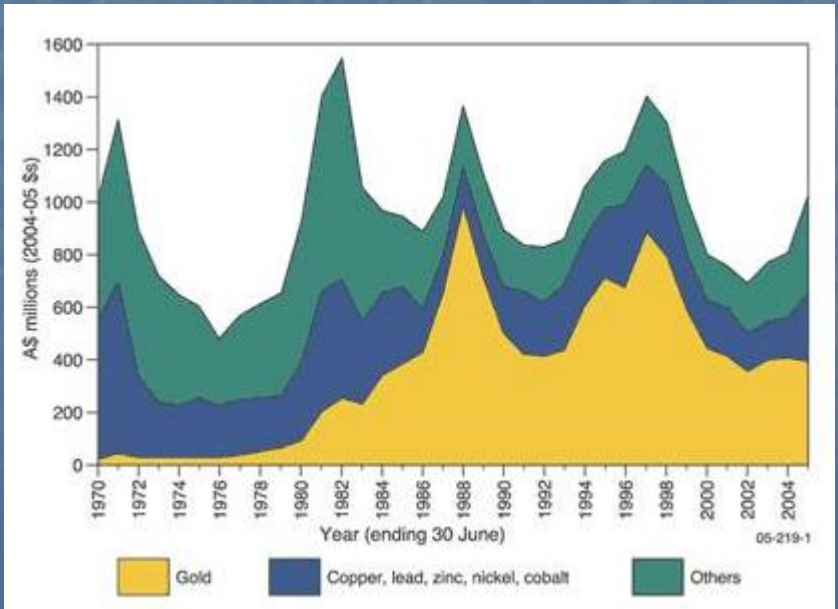
Post-Independence Period

- ✓Huge investments are key to the major discoveries in mining industry
- ✓Compare the exploration budgets of Australia and India
- ✓Australia spending >$300 M per annum on gold exploration

Australia



India

India's exploration expenditure for Precious metals stands at <US $5 M Per annum

GSI has spent about US$ 40M on Non-ferrous metal exploration in last 50 years *(source National Mineral Policy document)*

Post-Independence Period

- National Mineral Policy (NMP) revised in 1993 and MMRD act amended in 1994, paving the way for foreign companies to invest up to 50% in mining industry, other than atomic minerals and coal

- MMRD act was again changed in 1999, which gave prominence to development over regulation

- Through the new act, known as Mines and Minerals (Development and Regulation) (MMDR) Act, 1957, Reconnaissance Permits introduced and FDI cap increased from 50 to 100% for all minerals except diamonds. Subsequently, FDI in diamond industry was also increased to 100%

- These changes were met with limited success – only few companies sustained and continued with exploration – only few RPs and PLs were converted into MLs – as a result <1% of anticipated FDI has come into mining industry

- 196 RP's covering 264,520 sqkm and 65 PL's covering 90,143 sqkm were granted by July, 2005, mainly for ferrous metals and beach sands.

Post-Liberalization Period

Comparison between India and China in the post-liberalization scenario

China	India
Liberalized in 1990's	Liberalized in 1993
By 2003 36 companies 11,717 permits	Only few PLs and MLs granted till 2000
Gold production 1995 – 108 tons 1999 – 175tons 2007– 276 tons ~1000 small scale operations	Current production ~10 tons Hutti Mine & by-product from Copper Mines

Post-Liberalization Period

Problems with NMP of 1993

- No security of tenure from RP to PL stage, only priority, not gaurantee
- Size of the PL is too small – only 25 sq.km / per state
- Time limits for grant of various stages of licences although provided for, are never adhered to. Inordinate delays – Time taken between application and grant could be 6 months to 3 years upwards
- Failed to create a level playing field between private and public sector, as public sector companies are given priority over private companies. Mindset of bureaucracy is to support public sector companies irrespective of priority
- Policy offers no tax incentives on exploration expenditures and does not encourage Public listings to raise funds for exploration unlike many other countries. Tax write-offs for exploration expenditure generally available for only 4 years preceding production

Post-Liberalization Period

✓Constitution of high Level committee to review the NMP under the chairmanship of Mr. Anwarul Hoda, Member, Planning Commission of India (Hoda Committee) - to look in to issues/problems faced by the mining industry and to make recommendations for improvements and encourage FDI into mining sector

Post-Liberalization Period

Salient points of New Mining Policy

- ✓ Simplifying the grant procedures-total duration of RP and PL will be 8 years, no cumbersome application procedure
- ✓ Non-exclusive RP for different companies
- ✓ RP holders would be entitled to PL – this will provide better security of tenure
- ✓ Increase in the size of the PL area – PL size to be increased to 100 sq.km/state
- ✓ Level playing field for Private and Public companies
- ✓ Right to transfer PLs
- ✓ Suggestions made for tax incentives to the industry and creation of a second board to facilitate listing of exploration companies and other businesses

Post-Liberalization Period

✓During the last decade only a handful private companies have progressed their projects

✓Deccan Gold Mines and Geomysore Services (Ind) Pvt. Ltd has explored about 30,000 sq.km in various states of India

✓Identified several new areas for gold, nickel and platinum mineralization in the states of Karnataka, Andhra Pradesh, Chattisgarh, Madhya Pradesh and Maharastra

✓Filed about 70 PL applications over these areas

✓Also filed few mining lease applications for gold

✓Rio Tinto and Indo Gold , to name a couple of others have also progressed with their exploration in India

Future Outlook

- ✓Geological potential, mineral policy, political stability, infrastructure and utilities, financial regime, environmental policy
- ✓Several service providers like drilling and geophysical companies are entering India
- ✓Issues like flow-through tax incentives and ability to raise substantial capital through listings on the Indian stock exchanges are being discussed. Implementation will provide considerable boost to the mining industry

Thank You