

Directorate of Geology



DEPARTMENT OF MINES & GEOLOGY
Jharkhand, India

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Department of Mines & Geology

The main work and responsibility of the Department of Mines & Geology are :-

- To investigate and explore the mineral of Jharkhand state and find out their reserve and grade.
- To grant the mineral concession and their administration.
- To collect revenue from minerals mined in the state.

Under the Department of Mines and Geology two separate Directorates function to discharge the work and responsibilities of the Department. They are as follows :-

A. Directorate of Geology

B. Directorate of Mines

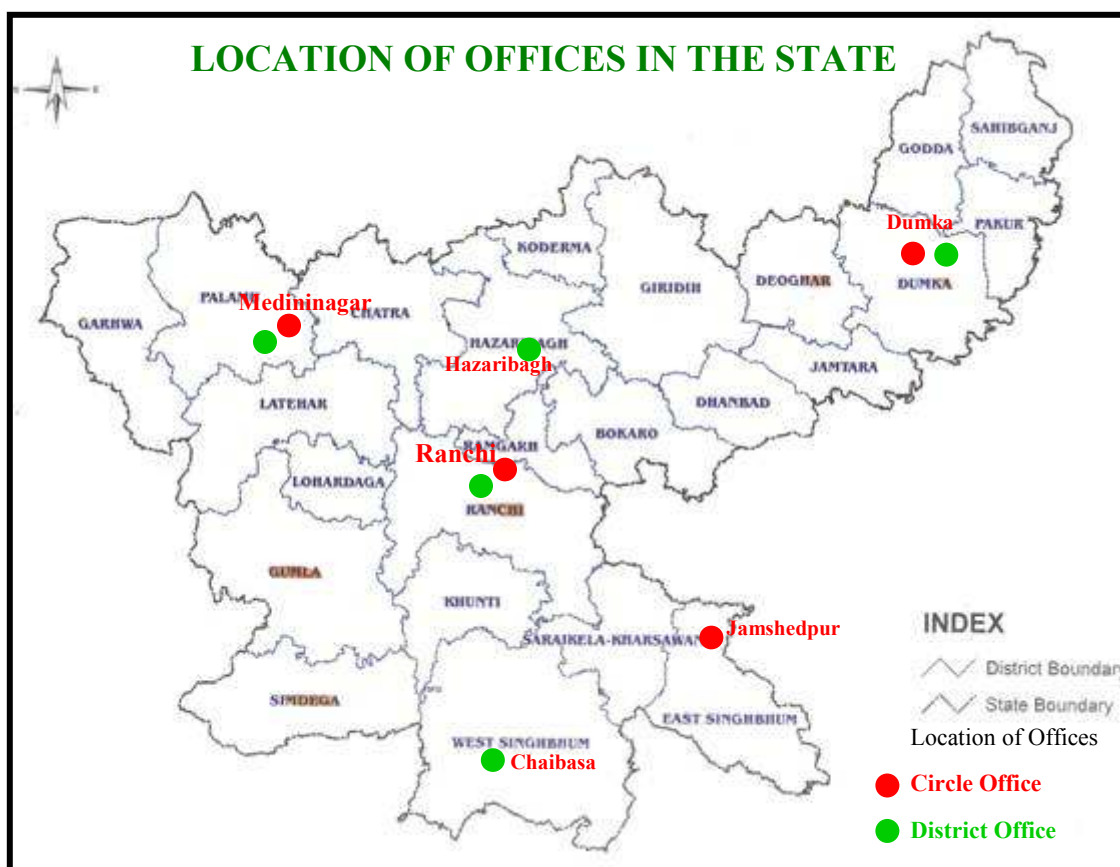
Functions and Responsibilities of Directorate of Geology

- Geological Exploration for proving the availability of mineral deposits in the State.
- Estimation of reserve and grade of minerals.
- Preparation of data base of minerals for mineral based industries.
- Conducting hydro-geological survey in plateau areas for drinking water.
- Conducting Geo-technical surveys for Engineering projects as and when required.

Organizational Structure of Directorate of Geology

- Directorate of Geology functions under the Department of Mines & Geology, Government of Jharkhand.
- Directorate has its headquarter at Ranchi and four circle offices exclusively for mineral exploration at Ranchi, Medininagar (Palamu), Jamshedpur (East Singhbhum) and Dumka (Santhal Pargana). Each circle office comprises district based operational units.

- There are two specialized wings – Engineering geology cell and Ground water cell.
- The primary functional units are Circle/District offices.
- The Directorate has specialized drilling unit and workshop located in Ranchi and Hazaribagh respectively.
- Directorate has Remote Sensing unit located in Ranchi under Additional Director of Geology.
- Directorate works through establishment of 17 offices located in 6 cities of the State.

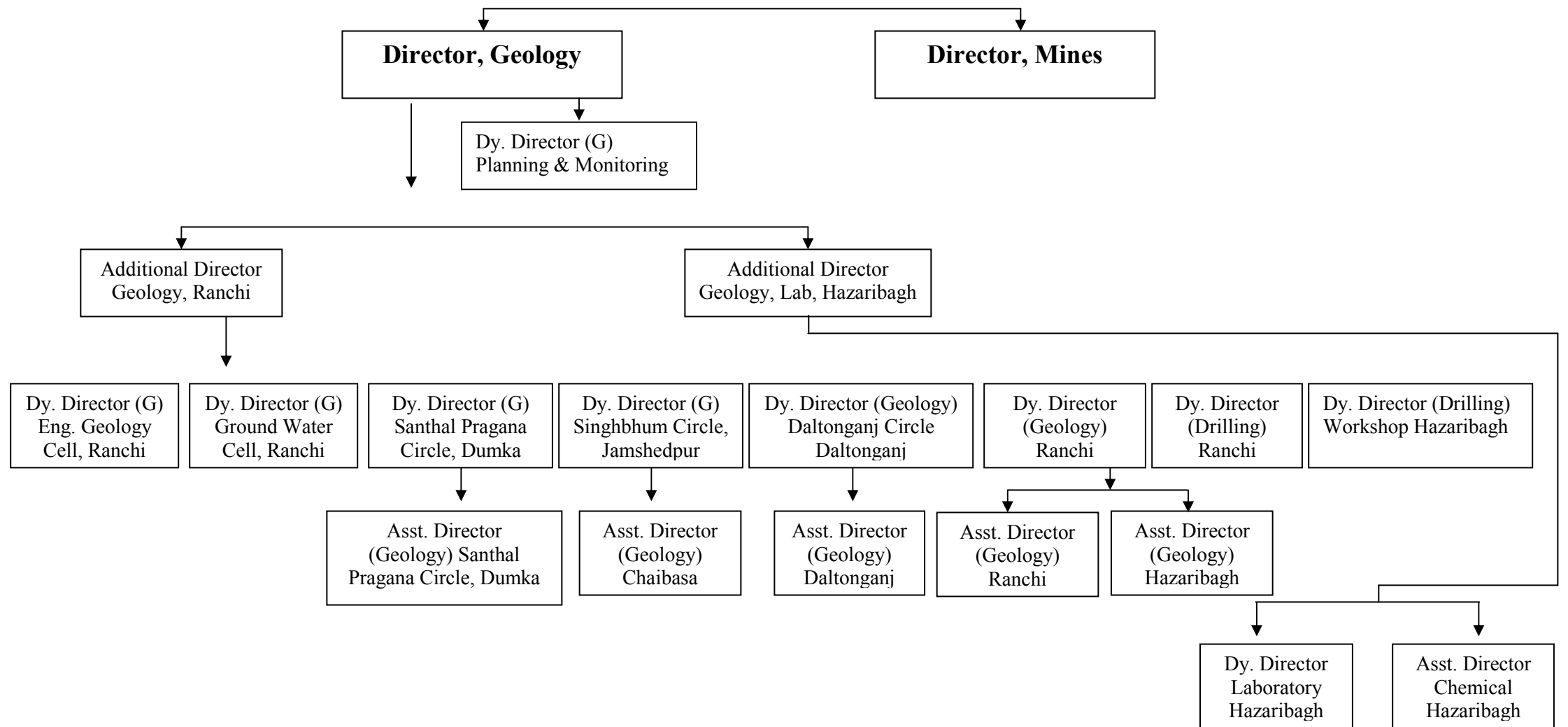


- A generalized Organizational structure of Directorate of Geology is presented below.

ORGANISATIONAL STRUCTURE OF DIRECTORATE OF GEOLOGY

Department of Mines & Geology

Commissioner – cum- Secretary



Consolidated details of sanctioned strength, working strength and vacant post of Directorate of Geology after eader division :

Sl. No.	Name of post	Cat.	Pay Scale	Sanction strength	Working strength	Vacant post
1	Director Geology	I	16400&20000	1	0	1
2	Additional Director, Geology	I	14300-18300	2	0	2
3	Deputy Director, Geology	I	12000-16500	7	2	5
4	Deputy Director, Laboratory	I	12000-16500	1	0	1
5	Deputy Director, Chemistry	I	12000-16500	1	0	1
6	Deputy Director, Drilling	I	12000-16500	2	0	2
7	Senior Geologist/Asst. Director	I	10000-15200	12	0	12
8	Drilling Engineer	I	10000-15200	2	0	2
9	Geologist	II	6500-10500	51	24	27
10	Account cum Budget Officer	II	6500-10500	1	0	1
11	Assistant Mineral Development Officer	II	6500-10500	1	0	1
12	Senior Chemist	II	8000-13500	1	1	0
13	Senior Scientific Officer	II	8000-13500	1	0	1
14	Scientific Officer	II	6500-10500	6	4	2
15	Chemist	II	6500-10500	6	1	5
16	Asst. Geologist	III	5500-9000	9	0	9
17	Head Clerk	III	4500-7000	9	3	6
18	Clerk	III	4000-6000	37	47	0
19	Typist	III	4000-6000	1	0	1
31	Routine Clerk	III	4000-6000	1	0	1
20	Draftsman	III	4000-6000	14	8	6
21	Surveyor	III	5000-9000	23	17	6
22	Senior Surveyor	III	5000-9000	2	0	2
23	Light Vehicle Driver	III	3050-4590	31	15	16
24	Steno	III	4000-6000	3	2	1
25	Account Inspector	III	4500-7000	1	0	1
26	Driller	III	5500-9000	18	0	18
27	Assistant Driller	III	5000-8000	33	2	31
28	Driller Assistant	III	3050-4590	19	0	19
29	Mechanic	III	3050-4590	12	4	8
30	Heavy Driver	III	3050-4590	12	2	10
32	Store Officer	III	5500-9000	2	0	2
33	Chemical Analyzer	III	5000-8000	30	2	28
34	Scientific Assistant	III	5000-8000	6	0	6
35	Label Writer	III	3050-4590	1	0	1

Profile of Directorate of Geology

36	Section Cutter	III	3050-4590	4	2	2
37	Electrician	III	3050-4590	1	0	1
38	Forman	III	5000-8000	3	1	2
39	Lab Attendant	IV	2610-3540	9	2	7
40	Truck Khalasi	IV	2550-3200	16	12	4
41	Drilling Khalasi	IV	2550-3200	48	16	32
42	Workshop Attendant	IV	2610-3540	3	2	1
43	Mali	IV	2550-3200	1	0	1
44	Adeshpal	IV	2550-3200	35	10	25
45	Night Guard	IV	2550-3200	19	7	12
46	Chainman	IV	2610-3540	27	10	17
Total				525	196	339

Offices under Directorate of Geology

➤ Office of Additional Director, Geology	- 2
➤ Office of Deputy Director, Geology	- 6
➤ Office of Deputy Director, Drilling	- 2
➤ Office of Assistant Director, Geology	- 5
➤ State Geological Laboratory	- 1
Total	16

Sanctioned post and working strength of Directorate.

➤ Gazetted sanctioned posts	- 95
working strength	- 32
➤ Non-Gazetted sanctioned posts	- 430
Working strength	- 204
➤ Total sanctioned post	- 525
Working strength	- 236

Equipment and Machineries for Geological Investigation

➤ Total no of survey Instruments	- 10
➤ Total no of Drilling Machines	- 08
➤ Total no of Pumps	- 13
➤ Total no of Trucks	- 5
➤ Total no of Jeep and Sumo Vehicles	- 25

Duties & Responsibilities of Officers

1. Geologist :-

Main work of Geologist is to carry out geological exploration to ascertain the resource, reserve and grade of occurrences of minerals in the state. Various scientific methods are applied for the mineral exploration such as Remote Sensing, Reconnaissance Survey, Geophysical & Geo-Chemical Prospecting, Small & Large Scale Mapping, Sampling, Pitting, Trenching, Drilling, Petrological & Chemical Analysis of Samples etc. Geologists also carry out Hydro-geological study of the nature of underground/surface water & fluctuation of water table to work out effective solution for drinking water in drought prone areas. They also help in the execution of various Engineering projects by carrying out geo-engineering study for the selection of dam sites & various micro and mega projects. Geologist is the main field working force of the Directorate of Geology.

2. Assistant Director, Geology :-

Assistant Director, Geology is the head of a District Geological Office. He is responsible for supervising, monitoring and guiding the geological exploration works carried out by the technical officers/personnel under him. He also performs part time field work.

3. Deputy Director, Geology :-

Deputy Director, Geology is the head of a Circle office and special cells such as Ground Water cell and Engineering Geology Cell. He is the controlling officer for the District Geological Office functioning under him.

Dy. Director, Geology supervises, monitors and guides the geological exploration field works carried out by the Geologist and other technical

personnel working under him. He also facilitates to make available the necessary infrastructure, equipments & resources to the field workers.

Dy. Director, Geology is responsible for preparation of proper geological reports related to the geological works carried out in his circle.

4. Deputy Director, Laboratory :-

Deputy Director, Laboratory is the functional incharge and responsible for analysis of mineral, rock & water in the State Geological Laboratory, Hazaribagh.

5. Deputy Director, Drilling :-

The main function and responsibility of the Dy. Director, Drilling is to supervise, guide and monitor the drilling work in course of Geological Exploration.

6. Additional Director, Geology :-

Additional Director, Geology is the head and controlling officer of all the geological exploration and drilling work carried out in different circles of the State. Additional Director, Geology is the link officer for the Directorate with regard to progress of Geological exploration in State.

7. Additional Director, Laboratory :-

Additional Director, Laboratory is the supervising officer of State Geological Laboratory, Hazaribagh as well as the main link officer with regard to mineral analysis and other petrological test.

8. Director, Geology :-

Director, Geology is the over all controlling officer and Incharge of the Directorate of Geology under whom Geological exploration, Mineral analysis, Drilling work, Data Bank functions.

Availability of Mineral in the State

- Jharkhand state is a mineral rich state of India.
- Approximately thirty two type of minerals occur in the state.
- The coal, iron ore, bauxite, limestone, copper, dolomite, pyroxenite deposit are available in plenty.
- The china clay, fireclay, magnetite, graphite, kyanite, quartzite, quartz-feldspar, mica & decorative stones are present in sufficient quantity.
- The reserve of andalusite, manganese, chromite, beryl, talc, gold, bentonite are in small quantity.

Important Minerals and their reserve in the State.

- The State occupies first position in coal reserve in the country with 7,38,897.83 million ton of coal deposits which are located in Dhanbad, Bokaro, Ramgarh, Hazaribagh, Dumka, Pakur, Deoghar, Godda, Giridih, Ranchi, Palamu, Chatra, Latehar districts.
- The State holds second position in Iron ore reserve in the country with a total reserve 4,035.74 Million tones. Haematite Iron ore is available in West Singhbhum and Magnetite Iron ore is available in East Singhbhum, Latehar and Palamu districts.
- The State occupies seventh position in the country with a total reserve of 117.54 million tones of Bauxite which is available in Gumla, Latehar and Lohardaga district.
- With 226.08 Million tones Copper deposit, the state holds Second position in the Country. The Copper deposit is available mainly in East Singhbhum district.
- The State occupies seventeenth position in Limestone deposit in the country with 745.77 Million tones of reserve which is distributed in Hazaribagh, Ranchi, Ramgarh, Godda, Palamu, Latehar, Bokaro and East Singhbhum district of the State.

Reserve of other minerals

Minerals	Reserve (In Million tones)	District
1. Apatite	7.27	West Singhbhum
2. Asbestos	0.15	West Singhbhum, Saraikela-Kharsawa
3. Bentonite	0.81	Sahebganj
4. Beryl	N.A.	Sahebganj, Simdega, Koderma
5. China clay	190.14	Lohardaga, Ranchi, Dumka, Sahebganj, East Singhbhum, West Singhbhum
6. Dolomite	51.09	Palamu, Garhwa
7 Limestone	745.77	Garhwa, Palamu, Ranchi, Ramgarh, Hazaribagh, Bokaro, West Singhbhum
8. Pyroxenite	0.83	East Singhbhum, Saraikela-Kharsawan
9. Feldspar	1.65	Dumka, Hazaribagh, Deoghar
10. Graphite	10.34	Palamu
11. Fireclay	66.80	Dhanbad, Hazaribagh, Palamu, Bokaro, Giridih, Ramgarh
12. Gold ore	0.035	Ranchi, East Singhbhum, West Singhbhum, Simdega, Palamu
13. Chromite	0.73	West Singhbhum
14. Kyanite	5.70	West Singhbhum, Saraikela-Kharsawa, East Singhbhum,
15. Manganese Ore	0.0007	West Singhbhum
16. Mica	0.000024	Koderma, Hazaribagh, Giridih
17. Quartz /Quartzite (Silica Sand)	154.76	East Singhbhum, West Singhbhum, Saraikela-Kharsawa, Dumka, Hazaribagh, Deoghar, Palamu, Sahebganj
18. Cobalt	9.00	East Singhbhum
19. Soap Stone	0.34	East Singhbhum, Saraikela-Kharsawa, Giridih
20. Magnesite	2.30	East Singhbhum
21. Baryte	0.03	Palamu, Ranchi, East Singhbhum
22. Magnetite	10.26	Palamu, East Singhbhum
23. Ocher	0.024	West Singhbhum

Resource – I.B.M.

* - Department. of Mines & Geology, Jharkhand

Mineral Exploration Conducted by Directorate in Jharkhand prior to formation of Jharkhand State. (1958-1990)

Name of Minerals	District	Small scale mapping (Sq. Km.)	Large Scale mapping (Sq. Km.)	Drilling (Meter)	Pitting/ Trenching (Cub.M.)	Reserve (Million tonnes)
Iron ore, Limestone, Bauxite, Dolomite, Magnetite, Pyroxenite, Soap Stone, Chromite, Graphite, Quartz, Gold, Decorative & Precious Stones.	Ranchi, Hazaribagh, Gumla, Lohardaga, Chatra, Palamu, Latehar, Garhwa	9,600.91	119.02	32,138.83	13,605.94	4,183.34

Mineral Exploration Conducted by Directorate after formation of Jharkhand State.

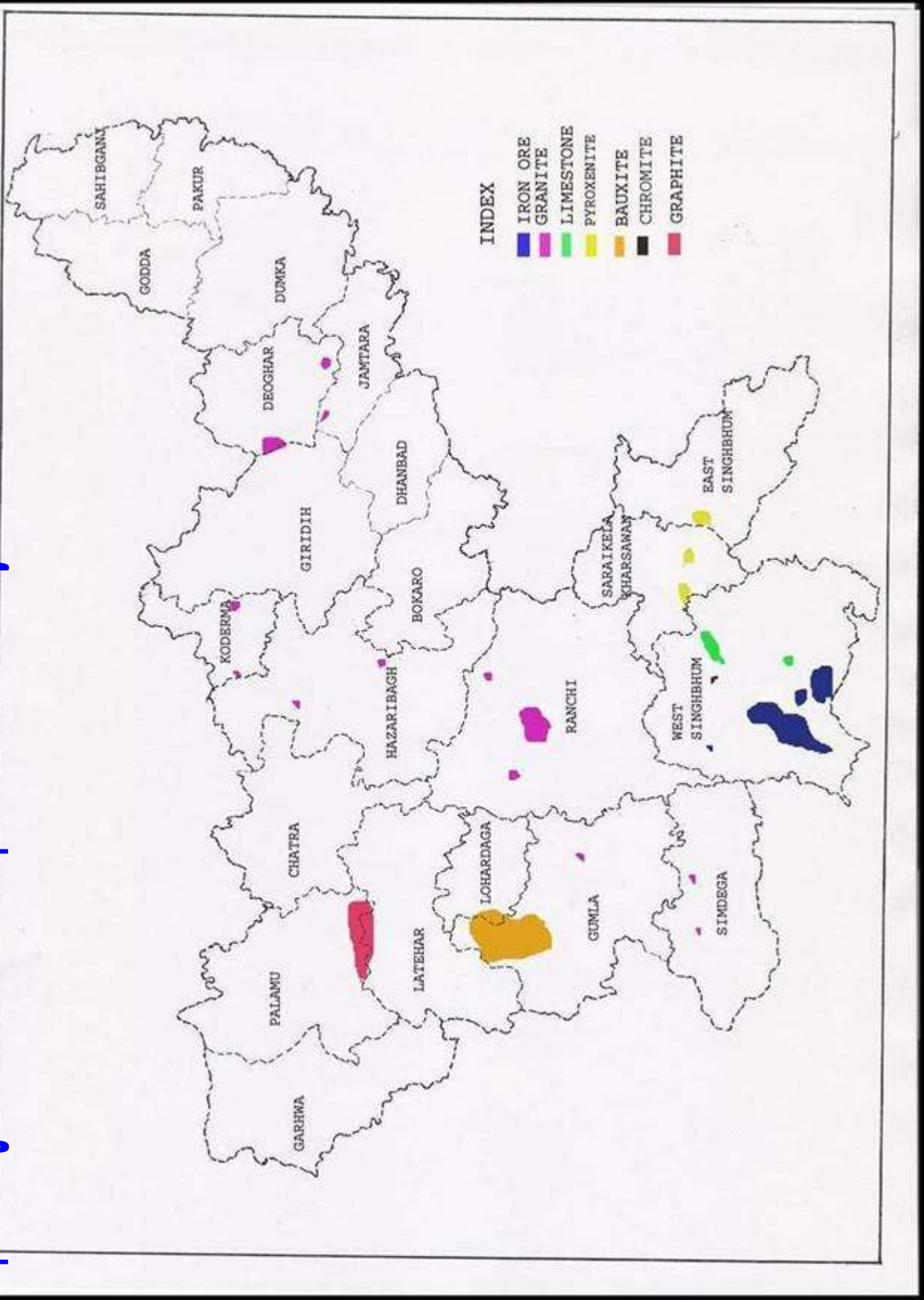
Year	Mineral	District	Small scale mapping (Sq. Km.)	Large Scale mapping (Sq. Km.)	Sampling	Drilling (Meter)
2000-01	Granite, Pyroxenite, Soap Stone, Coal, Graphite	Giridih, Saraikela-Kharsawan, East Singhbhum, Dumka, Palamu	336.00	1.50	126	—
2001-02	Granite, Pyroxenite, Graphite	Giridih, Jamtara, East Singhbhum, Saraikela-Kharsawan, Palamu	746.00	2.58	282	—
2002-03	Granite, Pyroxenite, Graphite, Base Metal	Koderma, Deoghar, Ranchi, Palamu, Saraikela-Kharsawan	517.00	1.51	359	56.20

Profile of Directorate of Geology

2003-04	Iron ore, Pyroxenite, Graphite, Granite, Limestone	West Singhbhum, East Singhbhum Palamu, Koderma, Deoghar	478.00	2.27	788	182.87
2004-05	Granite, Iron ore, Lime Stone, Bauxite, Graphite, Pyroxenite	Lohardaga, Latehar, Gumla, West Singhbhum, Hazaribagh, Deoghar	405.00	0.50	294	93.14
2005-06	Iron ore, Lime Stone, Granite	West Singhbhum, Jamtara, Simdega	100.00	13.75	885	333.70
2006-07	Iron ore, Lime Stone, Granite	West Singhbhum, Simdega	190.20	11.99	1832	722.24



Map Showing Location of Mineral Exploration Carried Out By The Directorate After Creation of Jharkhand



Reserve Estimation by Mineral Exploration

Mineral	Area of Exploration	District	Reserve Million tonnes
➤ Lime Stone	1. Jhinkpani, Chaibasa 2. Duarsai 3. Indikuri 4. Ramsai-Sosopi	East Singhbhum	37.71
➤ Iron ore	1. Noamudi, Bara Jamda 2. Gua, Bara Jamda 3. Roam-Lutuburu-Rajabera, Ghatkuri R.F. 4. Bokna 5. Diriburu 6. Roam-Lutuburu 7. Roam-Lutuburu Block-A 8. Lutuburu-Pansiraburu Block-B 9. Pansiraburu-Banalata Block-C 10. Banalata-Rajebera Block-D	West Singhbhum	487.90
➤ Graphite	1. Satbarwa 2. Piprakalan 3. Duba Nawa Ajlatua 4. Bhusariya Tola 5. Mukta Halumar	Palamu	3.505
➤ Pyroxenite	1. Chaliama, Arahasa, Rawankocha, Kalajharna, Rajnagar 2. Banksai 3. Maharajganj, Rajnagar Block 4. Baradoladih 5. Matku	Saraikela-Kharsawan	88.28
➤ Chromite	1. Tilaisud 2. Jojohatu 3. Roroburu 4. Kitaburu	West Singhbhum	—
➤ Bauxite	1. Bagru, Adar 2. Chirudih, Netarhat	Lohardaga, Gumla, Latehar	—

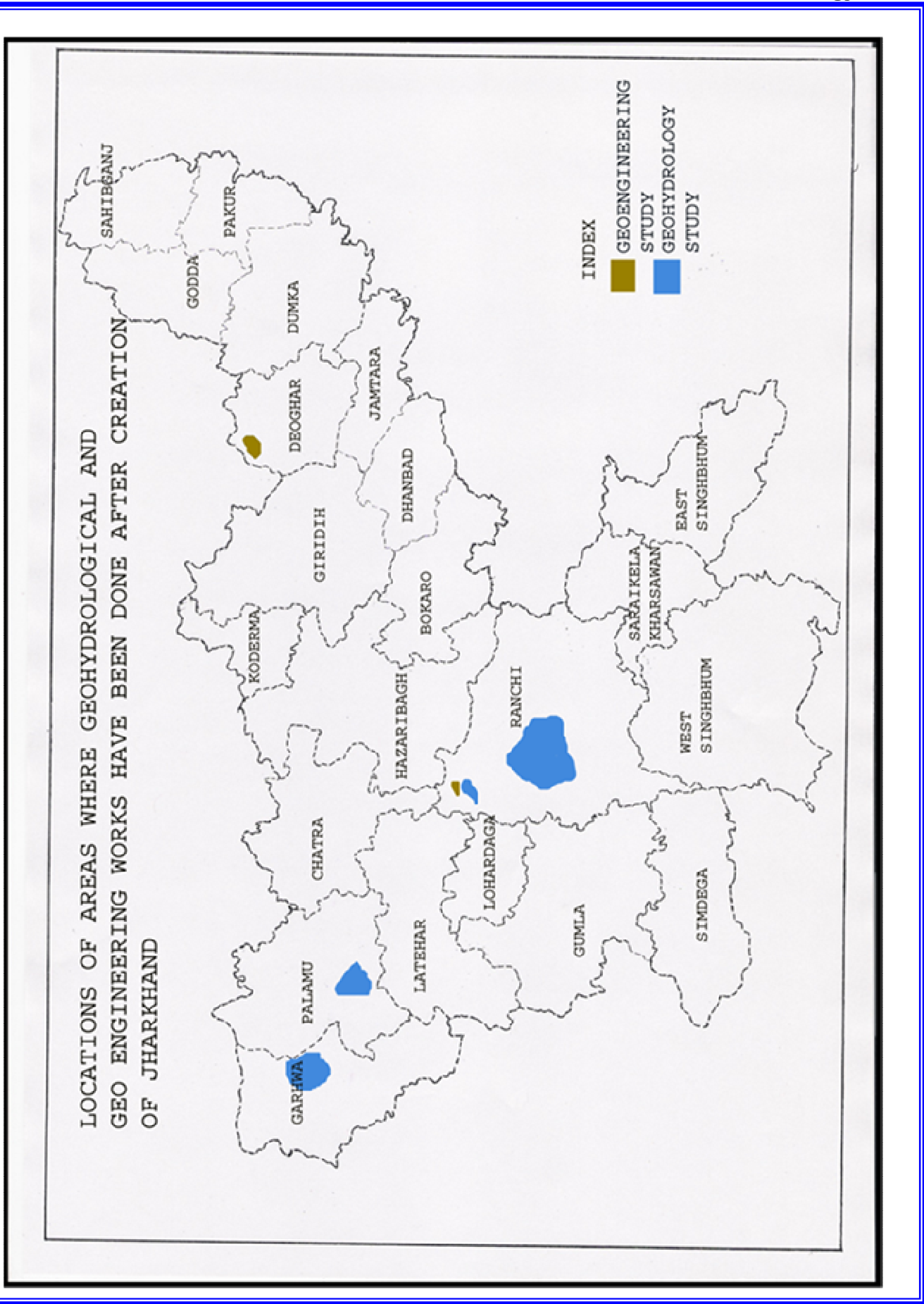
Profile of Directorate of Geology

Mineral	Area of Exploration	District	Reserve Million tonnes
Decorative & Precious Stone	1. Markacho	Koderma	0.0161
	2. Hundru, Chutupalu, Angara	Ranchi	0.5
	3. Tangarbasli	Ranchi	0.018
	4. Ferendatoli	Koderma	4.38
	5. Sarath & Madhupur	Deoghar	-
	6. Banskupi	Dumka	1.5
	7. Ichak	Hazaribagh	0.1642
	8. Biru, Bangru	Simdega	14.00
	9. Jamtara	Jamtara	11.90



Geological Studies Conducted for Ground Water

Sl. No.	Field Session	Investigation	Toposheet No.	Word done
1	2001-02	Ground water study of Tisri Ganwa area of Giridih district.	72L/2, 72L/14	Reconnaissance survey, ground water level studies and preparation of well inventory.
2	2002-03	Investigation in Ranchi Urban area for Ground water potential and aquifer.	73E	To prepare Hydrological data base of the area, study of lithology drainage pattern lineament and geomorphology was conducted.
3	2003-04	Collection of Ground water data and interpretation of Ranchi Urban area.	73E/7	Comprehensive study of lithology lineament and geomorphology of the area. Ground water fluctuation level from 0.45 to 10 meter B.G.L. was observed in the studied area.
4	2004-05	Reconnaissance survey of South Karanpura Coal field for ground water	73E/5, 73E/6	Rock type studies, structure and hydro geological studies was done in the area. Ground water fluctuation level from 0.90 to 9.7 meter below ground level. was observed.
5	2005-06	Quality of heavy mineral studies of water of Damodar and its tributaries.	73E/6, 73E/10	Reconnaissance survey of 350 sq. km. was conducted in the area to assess which industry is contributing more in the pollution of river of the area.
6	2006-07	Ground water studies of draught prone area of Garhwa and Palamu districts.	72D/4, 63P/16	Various types of hydrological studies conducted in the area reveals that ground water fluctuation level of the region is from 2 to 14 meter below ground level. and due to low density lineaments the ground water potential is limited.



Work Conducted in State Geological Laboratory, Hazaribagh

- Petrological and Chemical examination of different types of rocks and minerals for grade determination.
- Grade determination of minerals for royalty fixation.

Modern Equipment of the Laboratory

- Inductivity Coupled Plasma – OES instrument – Used for identification of elements in rocks and minerals.
- Themogravimetric Analyzer – 701 instrument – Used for assessment of carbon, ash, moisture content in coal and graphite.
- Double Beam – U.V.V.I. – 2001 instrument – Used for measurement of different Cations and anions
- Universal Polarizing Microscope – Used for identification of rocks and minerals.
- Flame Photometer – Used for identification of Alkali element, Li, K, Na, Rd. Ca, Mg and Sr. in rocks and minerals.



Statistics of Rocks and Minerals examined in the Laboratory

Year	Mineral	No. of Samples Examined		
		Petrological	Chemical	Total
2001-02	Coal, Lime Stone, Graphite, Pyroxenite	73	310	383
2002-03	Coal, Lime Stone, Graphite, Pyroxenite, Quartz	167	430	597
2003-04	Lime Stone, Graphite, Iron Ore, Pyroxenite	204	899	1103
2004-05	Lime Stone, Graphite, Feldspar, Quartz, Pyroxenite	118	719	837
2005-06	Lime Stone, Iron Ore, Water, Graphite	258	1285	1543
2006-07	Iron Ore, Lime Stone, Water, Graphite, Bauxite, Coal, Quartz, Marble, Soil	100	1637	1737
2007-08	Iron Ore, Manganese Ore Lime Stone, Bauxite, Pyroxenite, Quartzite, Marble, Quartz, Feldspar, Coal, Shale etc. Water, Graphite, Granite, Decorative stone	300	735	1035
2008-09	Coal, Iron Ore, Manganese Ore Lime Stone, Bauxite, Quartzite, Quartz, Feldspar, Shale, Water, Marble, Pyroxenite, Dolomite, Decorative stone, Graphite	374	636	1010

Petrological and Chemical Examinations are also done on payment in State Geological Laboratory.

Our Future Vision

Mineral Exploration

➤ In XIth Five Year Plan, Govt. of India has given stress on enrichment of Mineral Inventory by complete Geological investigation. With this aim, Directorate of Geology has prepared future programme for next five years (2007-2012) for Mineral Exploration, which incorporates following points:

- To reassess & enrich the reserve of known mineral deposits, extensive and detailed mineral exploration programme will be conducted.
- To delineate the probable potential areas of important mineral deposits, advanced modern techniques will be employed.
- To prepare comprehensive report of different minerals on the basis of available geological exploration data.
- To consolidate the information regarding the availability of low volume and high volume (Gold, Diamond etc) minerals available in the state.
- To get conducted deep seated drilling for enrichment of reserve position of mined out and fully investigated mineral deposits of the state.

Priority of Mineral Exploration

- Keeping in view the Mineral Exploration priority areas for future investigation are as under:
- To conduct detailed geological exploration in known virgin area for Iron Ore, Manganese, Chromite, Magnetite, Limestone, Dolomite, Graphite, Quartz, Gold, Diamond, Precious and semiprecious stones.

- Exploration of coal will be conducted at the request of private and public sector undertaking. Presently detailed exploration is being done at the request of Jharkhand State Mineral Development Corporation in Latehar coal block allotted to them by MOC of GOI.
- Identification of the areas of Limestone, Bauxite, Iron Ore, Graphite and kyanite deposit in the state by the techniques of Remote Sensing to prepare a map and carry out detailed geological exploration, where it has not been done earlier. This work will be completed in collaboration with JSAC and N.R.S.A.
- To prepare final and comprehensive report on the basis of work done in the state by Directorate and other institution for Manganese, Chromite, Magnetite, Dolomite, Bentonite, Pyroxenite and Graphite.
- To collect data and information regarding availability of Beryl, Platinum and Diamond in the state and conduct exploration, if required.
- Estimation of deep seated low grade reserve of Iron Ore in the mined out area, where the mining work has been stopped due to low-Fe content by deep seated drilling. Directorate will get this work done by N.M.D.C.
- By Remote Sensing method, a map of mining areas of Bauxite will be prepared and lease hold areas of Bauxite will be plotted on them. This will identify the lessees working outside their lease hold areas.