

Mineral Resources of Barmer

1. Introduction

Occupying an area of 28287 sq. kms. Barmer district lies in the western corner of Rajasthan. The district head quarter is situated on the National Highway No. 15, which runs almost north south and divides the district in two equal halves. The district is served by Jodhpur-Munaba meter gauge section of Northern Railway and a network of all weather roads. Its entire western boarder falls on Indo-Pak boarder and as such it has got great strategic importance and recently a good net work of boarder roads have been developed which provides good transport facilities.

Being part of the vast Thar desert, water was the main problem of this area in the past but new majority of the towns & villages have been linked with water reservoirs drawing water from tube wells and as such water problem is solved to a great extent.

2. Physical Features

The general appearance of the area is that of a desolated country with sand dunes here and there. The average height of the plains east of Barmer is about 150 m. above M.S.L. The hills near Jaisai (west of Barmer) rise to the height of 500 to 600 m. about M.S.L. The hills near Jaisai (west of Barmer) rise to the height of 500 to 600 m. above M.S.L. The region west of Barmer-consist of hillocks mainly composed of rhyolite and Granites. East wards from Barmer i.e. towards Sindri the cover of sand and sand dunes decreases and beyond Sindri the dunes are few. The area between Barmer and Sheo is mostly covered with blown sand, except in the vicinity of Bothia, west of Hathi Singh Ki Dhani and Koatra, where sand stone forms small hillocks. The high hills occurring between Barmer and Chotan are mostly constituted by rhyolites and granites of Malani igneous suit.

The Barmer district is dominantly an area of internal drainage. A few nalas originated from the hills carry water during the few showers the area receives, but are lost in the desert sand within a short distance.

The district experiences extreme climate typical of desert. The period from December to February constituted the cold season where as April to June is hot. Dust storms are frequent in May and June, which are the hottest months when maximum temperature reaches up to 48⁰ C.

Rainy season is from July to September. Average rain falls is about 25 cm.

3. Geology

The Geology of the district is obscured by extensive desert sand and sand of dunes. The rock formations are mostly exposed in patches.

The general stratigraphic succession worked out by Geological Survey of India is as under:

Formation	Age	Lithology
Kankar, vast gypsum & selenite deposit.	Recent to Sub recent	Sand, sandy soil,
Kapurdi formation	Lower to midale Eocene	Fuller's earth
Mandhi formation	Lower Eocene to upper	Clays & ferrugirtous sandstone & Akli
Umar formation	Paleocene	grey & black shales with or without lignite inter calations, bentonite, siliceous earth.
Fateh Garh formation	Middle Paleocene to upper cretaceous	Sandstone
Lathi formation	Triassic-Jurassic	Sandstone.
Malani igneous rock	Lateprecambrian	Rhyolite granites & associated intrusives.

The malani igneous suits of rocks are most extensive and are oldest in the area. They consist of volcanic rocks, rhyolites granites and associated intrusives like basic dykes aplites and quartz veins. Besides these volcanics, other rocks exposed in the area are sandstone belonging to Lathi, Fatehgarh and Mandhi formations, Akli and Kapurdi formations constituted by bentonite and Fuller's earth. They being soft, in the plains and mostly covered under blown sand.

4. Mineral Occurrences

Due to the absence of metamorphic rocks to which most of the minerals belong, no metamorphic mineral of economic importance was noted. The mineral wealth of the district is constituted by non-metallic minerals like Bentonite, Gypsum, Fuller's earth, Selenite, Siliceous earth Silica Sand, Lignite, Sandstone, etc. The details are as under.

4-1. Bentonite

Bentonite is an important naturally occurring clay of great commercial importance possessing inherent a bleaching properties. Two types of Bentonite are generally identified, one called swelling type and another non swelling type. The swelling type has low ratio of Soda to lime. The

important bentonite bearing localities of Barmer district along with probable reserves are as under:

Locality	Reserves
Hathi Singh Ki Dhani	1.78 Million tone
Harecha	8.89 Million tone
Sheo	1.12 Million tone
Sonari	0.98 Million tone
Bisala	5.30 Million tone
Bhadres	0.40 Million tone
Mahawar	0.01 Million tone

The total reserves comes out to be 20.28 million tonne. These reserves were proved by Geological Survey of India by hand auger drill and as such if systematic drilling and proving is done, the reserves will be much larger than indicated above. Recently department took some pitting to assess the quality and reserves of Bentonite and drilling has been proposed.

Except the Mahawar area which is about 5 km. south of Barmer, all other area fall north west of Barmer and can be approached by Barmer-Sheo road.

At present mining activity is going on mostly in Akli Thumbli area where 8 parties including R.S.M.D.C. are working.

The mineral is either sold as lumps or ground to powder by the units established at Barmer and Jodhpur. A Govt. of Rajasthan under taking R.S.M.D.C. has also erected its pulveriser in Barmer and it is under operation since December 1982.

4.2. Gypsum

Gypsum occupies a place of pride among all the other minerals found in Rajasthan. The state accounts for more than 90% of the country's production, which comes from Bikaner, Barmer, Jaisalmer, Shri Ganganagar and Nagur districts.

In Barmer district Gypsum is occurring at Kawas, Hema Ki Dhani, Uttarlai, Kurla, Shivkar, Gagra, Bajawa, Chitter Ka Par, Agoria, Ratau, etc. Out of these at Daboi, Gagra, Chitter Ka Par and Hema Ki Dhani, Gunga area are being mined by R.S.M.D.C. Recently two more gypsum deposits have been located by the deptt. Both of them can be approached by Barmer Sanchor National Highway No. 15. The area are Piprali and Jhakharda. Piprali area is about 10 kms east in Ram Hi Ka Gel where as Jhakharda is due west of Ram Ji Ka Gel at about 12 kms distance. The quality at both the places is good. The Jhakharda area has been applied by R.S.M.D.C. for mining lease. According to mineral policy of Government this mineral has been reserved for Government under taking only.

Most of the Gypsum produced from the district is sold to cement factories. Previously it was also used by Sindary Fertilizer plant. The $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ content of the mineral occurring in the district is varying from 60% to 80%.

4.3. Selenite

Selenite is a crystalline variety of gypsum forming flat transparent foliated plates. It occurs as aggregate of single or twinned crystals fully covered with clay material. It is used for the manufacture of plaster of Paris.

In Barmer district Selenite occurrences have been reported from Thob and Chitter Ka Par. The Thob area is at present under mining lease with M/s Neel Kanth Chemical works, Barmer. Here thickness of Selenite bed is varying from 10 to 0.40 cm. The Chitter Ka Par area has now been taken on lease by R.S.M.D.C. for gypsum and Selenite mineral and has started mining recently.

4.4. White Clay

In Barmer district the white clay deposit inter stratified with the sandstone are found near Bothia, Nagurda, Gunga and Nimbla.

Near Bothia the white clay deposits are exposed in a nala section about 1.5 km south west of village, G.S.I. did some prospecting in the past and indicated six clay beds interstratified with sandstone varying in thickness from 1 to 3 km. The area is about 28 kms north of Barmer railway station. The clay is pale white, partly gritty, plastic and consists mostly of Kaolinite. This clay has also been encountered in the boreholes drilled by department for lignite between Kapurdi and Bothia. The test conducted indicates that it can be utilized in low-grade pottery.

At Nagurda a dug well struck pale white to light pink clay at a depth of 235 ft from surface. The bottom of clay bed has not reached up to a depth of 240ft. The area is about 45 kms north of Barmer railway station. A sample tested at C.G.C.R.I. showed vitrification at 1450⁰ C. It may be suitable for low grade pottery and colour after firing was found to be gray with dark red specks.

At Gunga a bed of cream to white plastic clay 1.4 m. in thickness occurs about 1.2 km west of the village. The clay vitrifies at 1320⁰ C. It may be suitable for low-grade pottery.

At Nimla the white clays are occurring at about 1 km south of Nimla it is a fine-grained and vitrifies at 1400⁰ C. It may be suitable for earthenware and sanitary ware.

4.5. Siliceous Earth

Siliceous earth is mainly composed of colloidal silica. It resembles chalk or clays but contain chiefly 69 to 81% silica and 4 to 12% alumina with little calcium, magnesium and iron oxide. It is usually white yellow or cream in colour. It is homogenous, porous, easily breakable, light in weight. It has high absorption power. It is regarded as an excellent filter especially for colloidal one like oil and antibiotic products. Microporosity of siliceous earth helps removing such colloidal particles which easily do not pass through common filters, it is also used as polishing material for the manufacture of insulating bricks, as filter paper, synthetic rubber, etc.

In Barmer district siliceous earth occurring are available near village Matti Ka Gel, jato Ki Dhani, Bariyara, etc.

The reserves position of these blocks is as under: -

Name of block	Reserve	Average SiO₂
Matti Ka Gel	0.33 M.T.	74.32%
Babraras	0.66 M.T.	74.40%
Jato Ki Dhani	0.35 M.T.	72.00%
Bariyara	0.10 M.T.	76.28%

All these areas are approachable from Barmer-Jaisalmer road via village Khodal, Bariyara, etc.

At present four mining leases exits near village Bariyara, Matti Ka Gel and Gharvi Khurd.

4.6. Fuller's Earth

Fuller's earth is a variety of non-plastic clay, which has the power to decolourise oil, fats and greases. It is chiefly used in refining vegetable oil, animal fat, etc. It is also used for washing hair.

It is occurring at Kapurdi and Bhadka where mining activity is going on. Recently while drilling for lignite department encountered Fuller's earth in number of holes and it is expected to cover a wide spread area with variable thickness of over burden.

4.7. Vermiculite

Vermiculite a variety of mica is occurring near Simalya in Pachbhadra tehshil of Barmer district. The area was prospected by department and have proved its continuity up to 4m depth and likely to continue. The average width about 1.5 m. There are other such discontinuous bands with total length of 2 km. it can be approached from Kaludi village through Agravel road.

The village Kaludi itself is located on Barmer-Balotra road and is about 90 km from Barmer. About 10,000 tonnes of reserve are expected from the area.

4.8. Volcanic ash

It is located at number of places in district Barmer, viz. Siwana, Kusip, Ramdev Ki Bari, Nakoda, etc. and belong to Malani suit of igneous rocks of Post Delhi Age. It is fine grained hard and compact with varying colours from buff, yellowish, pinkish to grayish. The general analysis of volcanic ash is as under:

SiO ₂	77.75%
Al ₂ O ₃	4.27%
Fe ₂ O ₃	3.30%
TiO ₂	0.23%
P ₂ O ₅	0.90%

CaO	2.27%
MgO	3.20%
Na ₂ O	1.70%
K ₂ O	2.15%

4.9. Lignite

The Kapurdi lignite field of Barmer district stretches over about 25 kms in length from north to south and 10 kms in width from east to west. The area falls on toposheet No. 40 0/5; the Kapurdi village (71° 33': 25° 55') falls on National Highway No. 15 running between Kandia and Shri Ganganagar.

Investigation by drilling in the area was started in October 1980 by the State Department of Mines & Geology with the help of one machine. Later on to accelerate the work, more machines were added in January 1981, April 1982 and August 1982. A total 9040.00 m drilling spread over in 70 bore holes, covering an area of about 10 sq. km. was done by the State Department and then stopped its work and now further work is being done by Mineral Exploration Corporation, a Government of India undertaking. They have done about 80,000 m drilling and work is continue. About 60 million tones of lignite has been proved in Kapurdi area and beside it established lignite occurrence near Jalipa and Kawas.

Geological Survey of India is carrying out drilling work further north of Kapurdi block (between Bothia and Bhadkha villages) they have done about 800 m drilling spread over in 39 bore holes No. encouraging results are obtained so far.

From the exploratory drilling done it has been found that indivisual lignite seams varying in thickness from less than 50.00 cm to a maximum of 7.60 with cumulative thickness reaching up to 17.40 mts. The thick seams at places show tendency of splitting into a number of thin seams with intervening parting of black shale without lignite seams top middle and bottom have been indicated.

Since the exploration work is still going on as such more reserves are likely to be added to it.

Assuring 45 initial moisture, the average ash value is 11%, volatile matter 20%, fixed carbon 17% and calorific value 2700 k. Cal Kg.

The area seems to be promising and thermal power plant based on it may come up in near future.

4.10. Granite

Granite, a modern decorative stone is occurring in the district at number of places. The important being Mokalsar, Viratra, Bhachbhar, Dhorimana, etc. The pink and gray coloured granite of the area take good polish and possibility of taken out blocks is there. Presently no mining lease exists for it.