

Nagar Parkar

Granites of Sindh

Mines and Mineral Development Department
Government of Sindh



GRANITE DEPOSITS

NAGARPARKAR, SINDH, PAKISTAN

1. Location and Accessibility

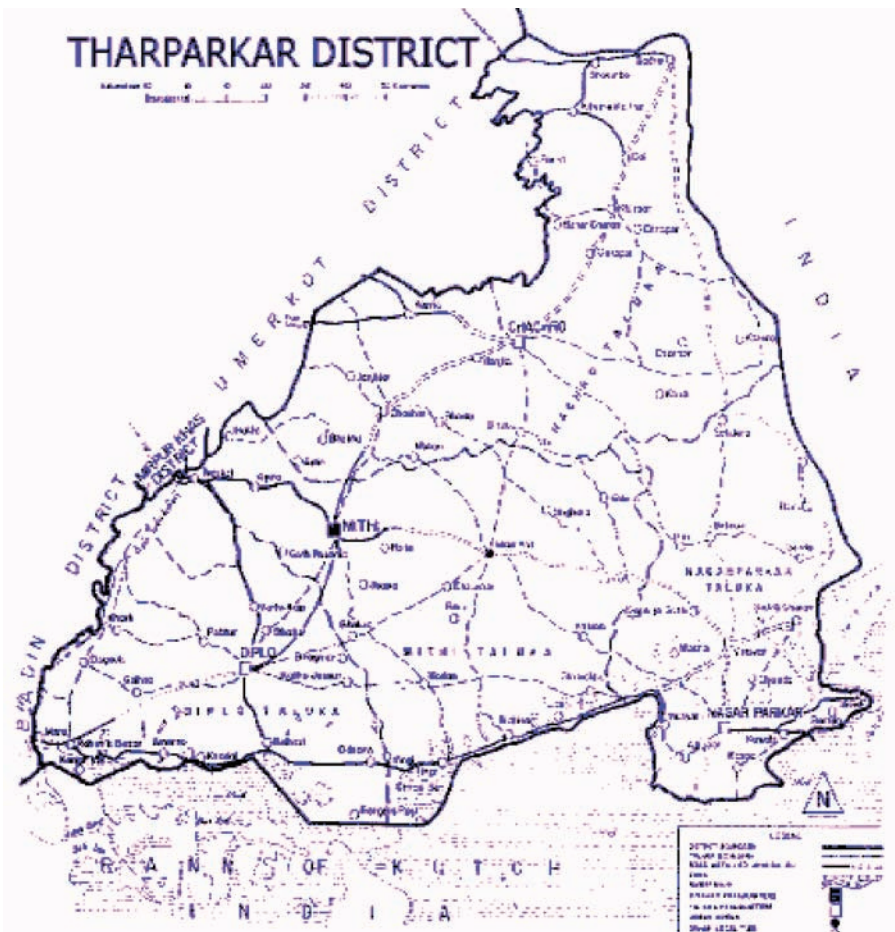
The Nagarparkar igneous complex is exposed in the southern extremity of the Tharparkar desert near the Runn of Kutch ($24^{\circ} 22' 18''$ N, $70^{\circ} 43' 14''$ E), covering an area of approximately 1000 sq. km. It is surrounded by Indian territory on three sides, thus forming an enclave of Pakistan within India.

The road from Hyderabad to Nagarparkar is metalled, which is near about 475 kms, e.g. Hyderabad – Badin – Mithi – Islamkot – Nagarparkar. Likewise Nagarparkar can also be reached via Karachi, Karachi – Thatta – Sujawal – Badin – Mithi – Islamkot – Nagarparkar. Nagarparkar is also at the other extremity on the Coastal Highway, the new road under construction. Its earth work is completed. It connects Karachi with Nagarparkar via Ketu Bundar – Badin – Nagarparkar.

2. Geology

2.1 General Geology

The Nagarparkar igneous complex is a Late Proterozoic fragment of the western Indian Shield. Six major magmatic phases of intrusive and extrusive



activity have been identified:

- 1) Basement rocks (metagabbroic and amphibolites)
- 2) Riebeckite-aegirine grey granite
- 3) Biotite-hornblende pink granite
- 4) Acid dyke
- 5) Rhyolites
- 6) Basic dykes

Nagarparkar area comprises of main Karunjhar hill and isolated hillocks of limited aerial extent, surrounded by sand covered plains. The hillocks predominantly consist of 8 to 10 varieties of pink and grey coloured granites. The hillocks include Voravoh, Churio, Berano, Parodharo, Dhedhvero, Dhingano, Chanida, Densi, Wadhrai, Ranpur and Kharsar, amongst others.

The principal range of Karunjhar is 19km in length and attains a height about 305m.

Geologically there is a variety of Quaternary deposits, subordinate and scattered Juro – Tertiary sandstones and clays, overlying a basement that is termed as the Nagar Igneous Complex. It is divided into Dhedvero basic intrusion, Nagar pink granite and Karunjhar grey granite.

2.2 Geological succession of the rocks of the Nagar Parkar area

Age	Formation	Lithology
Recent Early Recent	Unconsolidated Quaternary Deposits	Stream bed and flood plain deposits Playa and Evaporate deposits Outwash deposits Piedmont and sub-piedmont deposits
Late Pleistocene	Sedimentary Rocks	Aeoline sand deposits Runn of Kutch mud deposits Residual deposits: laterite/kaolinite Bartalao Sedimentary Unit
Pre-Cambrian	Nagarparkar Igneous Complex (Basement)	Basic dykes (youngest) Rhyolites Acid dykes Pink granites Grey granites Basement rocks (Metagabbro, Amphibolites)



2.3 The colours of Granite in Nagarparkar area

Due to the colour tone, grainsize, mineralogy, geochemistry, and mode of occurrence, the granites are grouped as:

Colour	Minerals
White	Pure K-feldspars and plagioclases
Grey	Quartz, Ca- plagioclases
Black	Pyroxenes, hornblendes
Pink to red	K-feldspars, limonite
Green	Olivine, plagioclases
Blue	Sodalite
Grey-bluish	Sometimes quartz, feldspars

2.4 Geotechnical Properties

Tested by Associazione Italiana Blocostuire (AIB), Italy

	Karunjhar Hill	Karunjhar Hill	Diensv Hill	Average
Volumetric weight	2.64	2.61	2.62	2.623 grs/cm ³
Coefficient of water absorption	0.29	0.30	0.35	0.313
Compressive strength	1282	1149	1215	1215 kg/cm ²
Flexure strength	178	119	132	143 kg/cm ²
Friction wear resistance	1.75	1.00	1.60	1.45 mm
Impact strength	50	55	45	50.0 cms

Dimension Stone Testing values per ASTM Standard Specifications

		Absorption (max) per ASTM C 97	Density (min) Per ASTM C 97	Modulus of Rupture (min) ASTM C 99(9) (10)		Compressive Strength (min) ASTM C 170		Abrasion Resistance (min) ASTM C241	
Stone Type	ASTM Standard	%	lbs/ft³	kg/m³	lbs/in²	Mpa	lbs/in²	Mpa	H _a
Granite	ASTM C 615	0.40 %	160	2,560	1,500	10.34	19,000	131	25

3. Climate

The climate of Nagarparkar is neither arid nor humid, due to the western coast of the Indian peninsula. In summer, the temperature rises to 50° C, whereas in winter the minimum is 12–15° C. The average rainfall is about 200mm per year, while in the south it is upto 500mm per year, mainly in July and August. Humidity is high in are area (60–80%).



4. Water Resources

4.1 Surface Water

Precipitation in the south of Tharparkar area (Nagarparkar), is the highest than in any other part of Thar, but most of the water flows to the low lying Runn of Kutch, after filling the Tarais and Talaos in the Nagarparkar and partially infiltrating sub-surface, raising the water table. This recharge through rain water runs for 4 – 5 months after monsoon and is used by humans and animals.

Sindh Irrigation Department has planned and put in implementation a gigantic surface water reservoirs plan. A large number of small dams / tanks are to be constructed; they have already started construction work on the following six dams: Bhodesar dam, Mulji Bund, Khararo Bund, Runpur Bund, Lakhi-jo-Wandio Bund and Tobrio Bund. The work on Lakhi-jo-Wandio Bund and Bhodessar dam is at an advanced stage and is nearing to completion; it is planned to be completed in the financial year 2008-2009.

When completed, these dams will change the scenario at Nagarparkar. The whole area will be lush green and blooming with agricultural crops. Simultaneously, the runoff, which is presently lost in Runn of Kutch, will be saved and utilized, for use by human population. Moreover, enough water will be available for all sorts of mining activity in future.





4.2 Groundwater

The hydrogeological studies and drill hole geology has shown existence of fresh water aquifer upto the depth of 70-80ft. Deep aquifers have also been discovered at different depths, in exploratory drill wells (upto 400ft at Pooran, wah), but none of these are potable water.

5. Infrastructure

Electricity: 11 KV feeder and 66 KV transmission lines have been laid out upto Nagar Parkar, by WAPDA.

Telephone: PTCL has already provided wireless V-phone facility in Nagarparkar. Recently mobile phone companies, such as Ufone and Paktel have also installed their phone-towers, thus the facility of cellular phone has also reached Nagarparkar.

Water Supply: Water pipelines have been extended and installed upto Khairo Ghulam Shah from Islam Kot. At present, for domestic use freshwater is being pumped out and supplied at Nagarparkar.

Rest Houses: Provincial Buildings Department has recently constructed a well-decorated four-suites rest house at Nagarparkar. They have further constructing another rest house with ten rooms; this is also nearing completion.

Construction of Airstrip: The scheme ‘Construction of Airstrip at Islamkot’, costing Rs.120 million, is currently being implemented.

6. Granite Deposits Feasibility Study

A thirty-months ‘Granite Deposits of Nagarparkar’ study has been assigned by the Directorate General of Mines and Mineral Development, Government of Sindh, at the Centre for Pure and Applied Geology, University of Sindh, Jamshoro, in May 2007. The study is still in progress. Key components of this study include: Geological mapping, mineralogical, petrographical, geo-





chemical, geo-technical, geo-hydrological, mining, marketing and EIA study of Granite Deposits of Nagarparkar.

The following granite reserves have been estimated by the Geological Survey of Pakistan (GSP), in the year 1977-78.

Grey Granites:	11811 million tons.
Pink Granites:	3813 million tons.
Adamellite :	240 million tons.
Total	15864 million tons.

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