CHAPTER - 8

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MINERAL AND NATURAL RESOURCES

In the conventional sense of mineral resource, the area does not have to offer either metalliferous or non-metalliferous type of deposits. However, the fossil fuels like oil & gas and lignite occur as a special type of mineral resource. Here, these resources are described and discussed under the general title of energy resources. The other surficial construction materials occurring as earth resources in the area are also quite significant. These include brick clays as well as sand & gravel as natural aggregates.

ENERGY RESOURCES

The study area lies in the Gujarat Alluvial Plain of the Sabarmati river basin. As already alluded in the earlier chapter, a thick marine sequence of Tertiary formations underlie the Quaternary sediments. The sinking trough of the Cambay basin gave rise to the enormous thickness to these Tertiary formations. Structural readjustments of this graben in the later dates developed favourable source rocks and traps for oil and gas.

ONGC has delineated several such sub-surface structures around Ahmedabad. Numbers of deep wells have been drilled within these structures for prospecting of oil and gas. Out of 26 wells drilled to tap natural energy resources in the Ahmedabad area, 3 are oil bearing and 4 are gas bearing. The wells have

penetrated as deep as 2500 m. Total 21 oil and gas bearing fields and structures have been discovered in the Ahmedabad-Mehsana block. Kalol and Kadi Formations occurring at depths ranging from 1100 to 1600 m are the main oil and gas producers in this field. Annual production from this field is around 20 lakh tones. The oil field is a doubly plunging anticline. The main oil producing sands are confined to Kalol Formation. The crude oil is of high viscosity, having specific gravity of 0.88 to 0.90.

COAL BED METHANE (CBM)

Lignito – Bituminous coals of about 63 billion tones occur in the sub-surface Kadi and Kalol Formations at the depths ranging from 700 to 1700m. These coal layers consist of 2 – 3 seams of 10 – 60 m with cumulative thickness of 10 – 110 m distributed in an area of about 5000 sq km within Ahmedabad – Mehsana block. About 115 bcm of recoverable CBM reserves have been estimated from these deposits (Sharma, 1998). This resource can generate about 5000 MW of electricity. ONGC and other private organizations have studied the process of gasification of these coal deposits. In future it may develop in a large power industry.

The oil and gas is being exploited from the great depths. Number of structural and stratigraphical traps are responsible for their accumulation. So far no perceptible effects can be detected on the surface induced by deep oil exploration. Similarly no major seismic activities has been recorded. Therefore, it will be difficult, at

present, to predict any tectonic movement along deep seated faults. At the same time, the ONGC has established large set up of organization in the northern and southern parts of the study area. Many industries related to oil exploration activities have largely been developed in the area. This has played a very important role in the process of urbanization. Inter action of human and the nature is very distinct in this activity.

CONSTRUCTION MATERIALS

The construction materials include fine aggregates, sands and brick clays. The river Sabarmati is the main source for the production of construction sands, kankar and gravel. Fine aggregates available from the river bed is very extensively used for construction purpose. Thousands of tones of such sand are being removed from the river bed every year. This sand has very appropriate engineering properties, giving it preference in all types of construction activities. Large scale removal of the river bed sand has resulted in to thinning of the upper river sand layer. Wherever the vehicular approach is easy, the sand is collected in huge quantities. However, this activity in few pockets has adversely affected the workings of jack wells in the river bed. Such wells have been drilled at a very shallow depth to tap the water flowing just below the river. This water is collected through horizontal pipes in central well. But the removal of sand has caused the choking of pipes by sand. This is a major problem, which ultimately causes the well failure.

Aeolian sand cover in the area provides good raw material for brick manufacturing. The brown coloured alluvial formation of the Recent geological age are used in manufacturing of bricks on a very large scale. In fact, sandy loam to clayey loam soils distributed over a wider area is being exploited for this purpose. This type of soil occurs up to a very shallow depth only. The Ahmedabad soils have shown that good quality full size bricks of compressive strength above 250 kg/cm^2 and water absorption as low as 3 to 4 % can be manufactured by firing the bricks at a temperature of 1000°C to 1100°C. Building bricks of compressive strength 35 to 70 kg/cm^2 can be produced at lower temperature of firing (Hajela, 1967). Better quality of bricks can be manufactured by controlling clay composition, removal of kankar or by grinding the soil. A concise account characteristics of brick soils of Ahmedabad is given in table 8.1. As a result of the availability of good brick soils, number of brick kilns have come up in the area. These brick kilns cover about 15 sq. km of the total AUDA area.

Table 8.1: Characteristics of brick manufacturing soils of Ahmedabad.

Soil depth (ft.)	Clay (%)	Silt (%)	Sand (%)	Kankar (%)	Lime (%)
0 – 1	31.8	22.8	45.4	-	0.35
1 – 2	21.4	10.6	68.0	-	0.15
2 – 3	22.2	8.8	69.0	-	0.12
3 – 4	28.4	16.8	54.8	-	0.15
4 – 5	33.7	17.9	48.4	2.5	1.00
5 - 6	26.8	25.2	48.0	13.5	3.25
6 - 7	29.2	21.0	49.8	16.24	5.1

Thus, both the resources are being exploited on a very large scale. This is in turn responsible for the growth of urban sector in the area. So far, they have not been studied as possible threats by the concerned authority. But, it is felt that now is the high time to under take proper and detail investigation to assess the future risks, if any posed by these activities.