CHAPTER - I

INTRODUCTION

During old stone age, men took efforts to make food and self protection with rocks like quartz. Later, man started to learn the art of grinding, grooving and polishing stones. This age is known as Neolithic or new stone age.

The life of Mohenjo - Daro and Harappa shows the use of copper and other metals. This is called copper stone age. The usage of Iron, steel, ornaments of gold, silver with diamond, emorold and blue stone are found in the National epics of the Ramayana and the Mahabaratha.

From the stone age onwards, the stones and minerals play a vital role in development of human being. In the Industrial point of view, all the raw materials are taken from earth, agriculture mining or from sea. Among them mineral resources are considered as the back bone of the industrial growth in our country.

Minerals are natural resources so it can’t be produced or created artificially. Once the minerals is extracted means the amount of mineral of the place comes to end. It never grows again. Thereby, we have to give much importance in using and extracting the minerals. For the proper exploration and to avoid exploitation of minerals several legislations are administered by Central and State Government, which are selectively examined in subsequent chapters.

Simply saying “mineral is an inorganic substance having a definite chemical composition and certain characteristic properties”.  

History of Mines

Indians use minerals from the prevedic age. Even though, the mining activities were increased during 19th century, there was no law for govern the mining operations.

In 1890, International Labour Organisation Conference was held at Berlin under the Secretary of state for India attended. Arising out of this conference the secretary of State for India Mr. Lord Cross suggested to the Government of India to pass the legislation for inspection of mines, for the regulation of employment of worker there in such as children, for the safety blasting and for the environmental protection.

Government of India appointed Mr.James Grindly as one of the Majesty’s Inspector of mines in England to inspect the Indian mines to report and recommend regulation for the protection of mines. At the end of 1894 Mr.Grindly recommended some regulations for working of mines and for maintenance of sanitation in mines.

“In the beginning of twentieth century India extract eleven kinds of metallic minerals and forty five kinds of non-metallic minerals. At that time India was self sufficient in thirty six minerals which constitute the primary raw materials for various industries”

There were 4383 mines in India at the end of 1996 out of which 338 were captive and 4045 were non captive mines There has been a remarkable growth in the production of important minerals and metals over the last decade.

“According to Indian Bureau of Mines, in the course of time. India has sixty one kinds of minerals under three heads. Table 1.1 shows the classification.

Table - 1.1
Variety of Minerals

<table>
<thead>
<tr>
<th>Fuels</th>
<th>Metallic minerals</th>
<th>Non-metallic minerals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>Bauxite</td>
<td>Agate</td>
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<tr>
<td>Lignite</td>
<td>Chromite</td>
<td>Apatite</td>
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<tr>
<td>Natural gas</td>
<td>Copper ore</td>
<td>Phosphorite</td>
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<tr>
<td>Petroleum</td>
<td>Diaspore</td>
<td>Asbestos</td>
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<tr>
<td>Gold</td>
<td>Ball clay</td>
<td>Pyrites</td>
</tr>
<tr>
<td>Lead</td>
<td>Barytes</td>
<td>Pyrophyllite</td>
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<tr>
<td>Manganese ore</td>
<td>Calcite</td>
<td>Quartz</td>
</tr>
<tr>
<td>Silver</td>
<td>chalk</td>
<td>Fuchsite</td>
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<tr>
<td>Tungsten</td>
<td>Kaolin</td>
<td>Silica sand</td>
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<tr>
<td>Zinc</td>
<td>Corundum</td>
<td>Moulding sand</td>
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<tr>
<td>Iron ore</td>
<td>Diamond</td>
<td>Salt</td>
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<tr>
<td></td>
<td>Dolomite</td>
<td>Sillimanite</td>
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<tr>
<td></td>
<td>Emerald</td>
<td>Slate</td>
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<tr>
<td></td>
<td>Feldspar</td>
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<td>Fireclay</td>
<td>Staurolite</td>
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<td>Fluorite</td>
<td>Sulphur</td>
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<td></td>
<td>Garnet</td>
<td>Vermiculite</td>
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<td></td>
<td>Graphite</td>
<td>Wollastonite</td>
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<td></td>
<td>Gypsum</td>
<td>Andalusite</td>
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<tr>
<td></td>
<td>Jasper</td>
<td>Chrysobery</td>
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<td></td>
<td>Kyanite</td>
<td>Zircon</td>
</tr>
<tr>
<td></td>
<td>Lime stone</td>
<td>Lapis-lazuli</td>
</tr>
<tr>
<td></td>
<td>Lime kankar</td>
<td>Diorite</td>
</tr>
</tbody>
</table>

Sources: Kishnaswamy, S1979 India’s Mineral Resources, Delhi: Oxford IBH Company Limited
The different minerals are grouped under the following three categories.

1. Fuel
2. Metallic Minerals
3. Non-metallic mineral⁵

In the non-metallic minerals “the world notable occurrences are found in twenty one countries. India has twelve percentage of world occurrences of non-metallic mineral.”⁶ Most of these resources are found in south states. In Tamil Nadu Quartz, Feldspar and Lime stone mines are found in Karur district.

“….Tamil Nadu has taken a pride place in the mineral map of India by exploring smaller but high grade Quartz and Feldspar of Salem-Namakkal and Karur - Dindukal belt….”⁷

“….to cite one example, the Japanese buyers who came to buy the Tamil Nadu quartz and feldspar suddenly started showing certain fascination for the quartz and feldspar occurring in a particular locality in Karur District. In fact they are ready to pay any price for the quartz occurring in this locality alone. The reason for this preference is these materials are free from IC, RB and Cs. Which find a very wide applications in electronic goods manufacturing industry…”⁸

⁵ Krishnan. M.S. 1976 geology of India and Burma, New Delhi: Satish kumar Jain Limited
⁷ Dr. Saravanan. S. MSc., Ph.D., FMS., Chairman, Managing Director of TAIN and special officer collegiate Education, Government of Tamil Nadu, unpublished matter conference speech on 1999 at Chennai -83.
⁸ Dr. Saravanan. S. MSc., Ph.D., FMS., Chairman, Managing Director of TAIN and special officer collegiate Education, Government of Tamil Nadu, unpublished matter conference speech on 1999 at Chennai -83.
“In Tamil Nadu important occurrences of quartz and feldspar are found in Manaparai and Karur Taluk of Tiruchirappalli District. Of which Karur - Kulithalai belt has crystalline limestones Karur - Dindigul belt has quartz and feldspar”

Therefore a brief explanation of these mineral are given here.

**PRODUCT PROFILE**

**Quartz**

“It is a crystalline silica, an important rock forming minerals: Sio2 it is next to feldspar the commonest minerals. Quartz is the commonest gange minerals of ore deposit forms in the major proportion of most sands and metamorphic and sedimentary rocks”. Naturally, the quartz has hardness, wide geographic distribution and wide geologic occurrence.

**Types of Quartz**

Depend upon the ore ingredients it is classified as the following types.

1. Quartz - bearing monzonite
2. Quartz - bearing diorite
3. Quartz - flooded lime stone
4. Quartz - free wacke
5. Quartz - gray wacke
6. Quartzine
7. Quartzite
8. Quartznorite

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In the growth of rock the ingredients are changed stage by stage. Every kind of quartz has different features. In practice the quartz are classified as A grade, B grade, Milky, Smokey and Glassy.

**Uses**

Quartz are used to produce lenses, wedges, and prisms in optical instruments and produce the frequency control electronic components viz. resistance, transistors, capacitors and integrated circuits ICs, to prepare the fashioned beads and other ornamental objects.

**Feldspar**

“Feldspar are usually white or nearly to white and clear and translucent have a specified amount of hardness, frequently display twinning exhibit monoclinic or triclinic symmetry. On decomposition feldspar yield a large part of the clay of soil and also the mineral kaolinite”\(^\text{11}\)

Feldspar is found in pegmatite dikes associated with quartz. Although pegmatite deposits are widely distributed geographically, feldspar sufficiently free from impurities and occurring in large. It is easily minable any small bodies can extract it.

**Types of Feldspar**

According to the classification of IBM the following four types are found

1. Feldspathic sand stone
2. Feldpathic litherenite
3. Plagioclase feldspar
4. Celsian feldspar

\(^\text{11}\) Bates, L. and Jackson, A.1987 Glossary of Geology, America: Geological Institute Alexandria P.238
In practice the classifications are not taken into consideration. Because the stone has all the four ingredients. But proportionately it varied.

**Uses**

Used in glass industries, enamel industries and ceramic industries and also used to produce soap, scouring powder and washing powder.

**Limestone**

“A sedimentary rock consisting chiefly (more than 50% by weight or under microscope) of calcium carbonate, primarily in the form of the mineral calcite and with or without magnesium carbonate specifically a carbonate sedimentary rock containing more than 95 percentage calcite and less than five percentage dolomite common minor constituents include silica, feldspar, clay, pyrite and siderite.”

**Types of Limestone**

As per IBM there are two types of limestone such as:

1. Lime Silicate
2. Lime soda

**Uses**

In the sugar industry this limestone is used to remove the impurities from the cane juices. In the water treatment it is used for the process of softening the hard water. In the tannery industry it is used for dressing of crude leather. In the textile industries it is used to bleach the threads and colour dying. In the photographic filed it is used for litho printing.

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Mining

“The process of extracting metallic or non-metallic mineral deposits from earth. The term may also include preliminary treatment e.g., cleaning, sizing and removal of waste burdens”\textsuperscript{13}

Process of Mining

The manual operated mines are owned by small mining owners. They do not have much of knowledge about the modernization and technical upgradation. It is observed that many small scattered pocket mineral deposits. Which are not feasible for large mining industries and hence small mining owners are concentrating in the small mines.

Figure 1.1 shows the process of mining. In the mining operation each and every process is regulated by mines Act 1952. Existing process of mining Act is governed by Environmental protection Act 1986.

\textsuperscript{13} Rehesvsky, V.V.1985, Opencast Mining Units Operations, Moscow: Mir Publishers
Figure 1.1

Process of Mining

Prospecting → Leasing → Drilling → Blasting → Dressing → Cutting → Crushing → Loading
Prospecting

After seeking and capturing the orders for appropriate material the process of mining begins from the prospecting. In practical the potentials are not scientifically identified. Mineral deposits are identified by the owners with their traditional experiences. The field workers of mine owners help in the process of identification of required materials. Field workers have link with the people living in different areas from whom they collect the information regarding the mineral deposits. The quantum of mineral deposits are roughly estimated by the field workers and there is no scientific measurement. Sometimes the owners may have larger quantities than the estimation and also vice-versa.

The field workers, with their rich experience they are able to identify the quality of the minerals deposited. There is no scientific facilities available to the small owners in respect of the quality of minerals. So the small mine owners who are almost dependant on the advice of field workers in the purchase or lease of land for mining. Slide 1.1 and 1.2 shows the virgin area of mineral deposits.

Leasing

After getting receipt of application a team of officers from local Directorate of Geology and Mining inspect the area and submit a technical report to the state Government and then they provide the Prospective License (PL) for a year.

After precise area communication, the applicant prepares and submits a mining plan, after inspection of the area by an officer from IBM the plan gets approved and the same is submitted to the Government and then the IBM provide
Mining License (ML) for a maximum period of twenty years. This process involves quite a deal of money, time and energy. Collection of relevant details and submission of application itself is a tedious process.

**Drilling**

Manually they make drills by the use of chisels. In the manual drilling the hole diameter varying from 32 mm. to 38 mm. the hole depth is one or one and half feet. There is no fixed depth size. At a time three to five holes are user to blast. If the mine owners use air compressor the whole depth is two feet and they blast five to twenty holes at a time. Slide 1.3 shows that drilling by machineries

**Blasting**

In the blasting maintenance of safety distance is the foremost pre-requisite “Mines Act 1952 and Environmental Protection Act 1986 have indicated the safety distance for blasting.”

It stipulates mine workings can be extended up to 45 meters from any rail road or permanent structure. The safety distance stipulated from the bank of river, canal or reservoir is only fifteen meters. Pollution Control Board authorities point out ruling of the Supreme Court and insist that no mining operation should be carried out with a radius of 50 meters if there is any hutment or hamlet. Slide 1.4 shows the process of blasting and 1.5 shows the manual extraction by chisel.

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14 Saravanan, S.1989, Prospecting for Small Scale Mining, Unpublished matter’s seminar paper Geology department Anna University, Madras.
Dressing

Removal of unwanted layer is called dressing. Depending on the requirement of buyers the industries cut the extracted ores and size. Some industries offered chips alone. So, the cutting materials are crushed again. These dressing, cutting and crushing process are done in the top of the pit by manually. Slide 1.6 and 1.7 shows the process of dressing and cutting by manually.

The Process of mining are basically classified by

a) Over Burden Stripping
b) In-pit Operations.
c) Dump Yard Operations.

These classifications of mining process are explained in Figure 1.2.

Over Burden Stripping

Here the operation includes removal of top soil and outcrop of mineral - top soil mix. The top soil removed separately according to the flotation of mineral resources. The un required and unpredictable measurement of top soil are excavate and dumped in other place.

Similarly the mineral outcrops encountered are removed separately. After removal of these burdens, the owners can see the required graded minerals to blast.

In-pit Operations

The in-pit operation includes occupying and formation of entry roads, formation of benches and formation of working faces. Drilling and blasting of large boulders. After excavation dressing, sizing and loading of materials are done on the pit. Slide 1.8 shows the manual loading.
Classifications of Mining Process

Over Burden Stripping
- Top Soil
- Mineral Mix
  - By Chisle

Inpit Operators
- Drilling
- Blasting
  - By air Compressure
- Dressing & Cutting

Dump Yard Operations
- Top Soil Yard
- Mineral Mix Yard
  - Sorting Yard
  - Required graded yard
  - Subgraded yard

Figure 1.2
Dump yard Operations

There are three categories of dump yards are maintained. They are top soil dump yard, mineral mix dump yard, sorting dump yard. In which the top soil dump yards are very height and dozed down slope to preserve for future use of top soil for afforestation programmes and to fulfill the assurance gave to land lord. Mineral mix dump yards are involved in in-pit operation. Out of which the organization sort out second quality of minerals. Sorting dump yards are ready loading. Here the total conservation of Minerals are sorted out on grade wise and size wise in lumps and chips. Slide 1.9 and 1.10 shows the lumps and grade wise dump yards.

Unfortunately the flotation of deposit may goes below the dump yards. In this situation the mine operators meet too expenses to switch over the dump yard in another place.

PROFILE OF KARUR DISTRICT

History

Karur is one of the ancient cities in Tamil Nadu, it was ruled by the Cheras, Cholas, the Naickers, and the British successively. There is a proof that Karur may have been the centre for old jewellery-making and gem setting (with the gold imported mainly from Rome), as seen from various excavations. According to the Hindu mythology, Brahma began the work of creation here, which is referred to as the "place of the sacred cow."
Karur has a very long history and has been sung by various sangam poets. In history, it has been the battleground of various Tamil Kings like Chera, Chola, Pandya and Pallavas because of strategic location. The district has a very rich and varied cultural heritage. Karuvoo Thevar born in Karur, is one among the nine devotees who sung the divine Music Thiruvichaippa, which is the ninth Thirumurai. He is the single largest composer among the nine authors of Thiruvichaippa. He lived during the reign of the great Raja Raja Chola-I. In addition to the famous Siva temple, there is a Vishnu temple at Thiruvithuvakkodu, a suburb of Karur, sung by famous Kulasekara Alwar[7-8th century AD]. who was the ruler of Kongu nadu. The same temple is presumably mentioned in epic Silappadikaram as Adaha maadam Ranganathar whose blessings Cheran Senguttuvan sought before his north Indian expedition.

Karur is one of the oldest towns in Tamil Nadu and has played a very significant role in the history and culture of the Tamils. Its history dates back over 2000 years, and has been a flourishing trading centre even in the early Sangam days. Epigraphical, numismatic, archaeological and literary evidences have proved beyond doubt that Karur was the capital of early Chera kings of Sangam age. It was called Karuvoor or Vanji during Sangam days. There has been a plethora of rare findings during the archaeological excavations undertaken in Karur. These include mat-designed pottery, bricks, mud-toys, Roman coins, Chera Coins, Pallava Coins, Roman Amphorae, Rasset coated ware, rare rings etc. Karur was built on the banks of river Amaravathi which was called Aanporunai during the Sangam days. The names of the early Chera kings who ruled from Karur, have
been found in the rock inscriptions in Aru Nattar Malai nearer to Karur. The Tamil epic Silapathikaram mentions that the famous Chera King Cheran Senguttuvan ruled from Karur. In 150 Greek scholars Ptolemy mentioned “Korevora” (Karur) as a very famous inland trading centre in Tamil Nadu. After the early Cheras, Karur was conquered and ruled by Pandyas followed by Pallavas and later Cholas. Karur was under the rule of Cholas for a long time. Later the Naickers followed by Tipu Sultan also ruled Karur. The British added Karur to their possessions after destroying the Karur Fort during their war against Tipu Sultan in 1783. There is a memorial at Rayanur near Karur for the warriors who lost their lives in the fight against the British in the Anglo-Mysore wars. Thereafter Karur became part of British India and was first part of Coimbatore District and later Tiruchirappalli District.

Karur is also a part of Kongu Nadu. The history of Kongu Nadu dates back to the 8th century. The name Kongunadu originated from the term "Kongu", meaning nectar or honey. Kongu came to be called as Kongu Nadu with the growth of civilization. The ancient Kongunadu country was made up of various districts and taluks which are currently known as Palani, Dharapuram, Karur, Nammakkal, Thiruchengodu, Erode, Salem, Dharmapuri, Satyamangalam, Nilgiris, Avinashi, Coimbatore, Pollachi and Udumalpet. Kongunadu was blessed with enormous wealth, a pleasant climate and distinct features. Kongunadu was ruled over by the Chera, Chola, Pandya, Hoysala, Muslim rulers and finally the British.
Origin

Karur Taluk, which was once a part of Coimbatore district, was merged with Tiruchirappalli district during 1910. A separate Karur district was formed on 30th September 1995 by trifurcating Tiruchirappalli district. Initially, Karur District was carved out of the composite Tiruchirapalli district, consisting of three taluks namely, Karur, Kulithalai and Manaparai. Subsequently Manaparai Taluk was decoupled and Musiri Taluk was included in Karur District. Later Musiri Taluk was decoupled from Karur district. Karur District, with headquarters at Karur, is the most centrally located district of Tamil Nadu. It’s about 371 km south west of Chennai (Madras), the capital of Tamil Nadu. The Karur district was formed through the Government Order 913 dated 30.10.1995.

Boundaries

Karur district is bounded by Namakkal District in the north, Dindigul District in the south, Tiruchirapalli District on the east and Erode District on the west. Figure 1.3 shows the mineral pockets of Karur District. This is an evidence of the potentialities of that district with reference to minerals.

Geographical Segmentations

“The Karur District has a geographical area of 29.50 thousand square Kilometers, which area located between 11.00 th degree to 12.00th degree of North Latitude and in between 77.28 degree to 78.50 degree of East Longitude”.

The Karur district was segmented by four taluks namely Aravakurichi, Karur, Krishnarayapuram and Kulithalai. Which are shown in Figure in 1.4.

15 Source: www. Karur.nic.in/district.htm.
This four taluks were segmented into eight blocks namely Karur, Paramathi, Thanthoni, Krishnarayapuram, Aravakurichi, Kulithalai, Thogamalai, and Kadavur shown in Figure 1.5 and fifteen town panchayats namely Pugalur, Punjaithottkurichi, Punjaipugallur, Karur, Inamkarur, Puliyur, Pallapatti, Aravakurichi, Thanthoni, Uppidamangalam, Krishnarayapuram, Kulithalai, Marudur, Cholapuram, and Nangavaram which are shown in figure 1.6.

**Potentials of Karur District**

**Rivers**

The Karur district is made textile by the rich contribution of the following rivers viz. Noyal, Cauvery, Kudaganaru and Amaravathi. Figure 1.7 shows the river floatation of Karur District.

**Educational Facilities**

Number of educational institutions render their valuable services to this district to remove illiteracy. “There are 153 Kinder garden schools, 842 elementary schools 34 higher secondary schools, seven arts and Science colleges, three engineering colleges and four industrial training institutes are situated in Karur District.”

**Population**

“As on 2008 The district has the population of 19,03,000 of which 951861 are men and 9,51,139 are women. The strength educated population was 10,93,501”

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16 Source: Primary data collected from Government Statistical Department.
17 Source: Primary data collected from Government Statistical Department.
Figure - 1.5
Figure - 1.6
Figure - 1.7
Transport Facilities

“Karur being an industrial and commercial town, connected by 93.85 kilometers of broad gauge railways. The broad gauge railways connect metropolitan and cosmopolitan cities in India. National Highways numbered NH47 and NH45 of 118.8 Kilometers are formed in this district. Apart from this State Highways of 124.746 kms and Municipalities, Panchayats Unions and town panchayats roads of 5177.080 Kilometers are facilitates to the transport of Karur District”

Figure 1.8 shows the transport facilities of Karur District.

Industrial Background of Karur District

Tamil Nadu Newsprint and Paper Limited

A very good Industrial Climate prevails in Karur District. Tamil Nadu News Print and Papers Ltd., TNPL was established in the early 80’s at Pugalur of Karur District. It is the India’s largest non-wood based paper maker. It is one of the Modern paper mill with an unique bagasse handling and pulping system, multifuel boilers, mechanized finishing section and a sophisticated R&D center.

Chettinad Cement Corporation Ltd.,

The Chettinad Cement Corporation Ltd was formed 1962 at Puliyur of Karur District. Now they produce nine varieties of cements. Apart from cement, the Chettinad House is today engaged on Thermal power manufacturing, wind form, granite, engineering, silica, quartz, and feldspar processing and exporting, transportation, shipping, forwarding and logistics services.

18 Source: www.karur.nic.in/distprof.htm.
**Textile Industry**

In the international textile map, Karur is the remarkable place for the handloom “made-ups”. The weaving industry of Karur district has a wider reputation for its high quality of products. Some of the handloom made-ups exported from Karur are Bedspreads, Towels, Floor rugs, Tea towels, Napkins, Aprons, Kitchen towels, Pot holders, Plate mats, Bath Mats, Tea mats, Curtains, Pillow, Quill covers, Shower curtains etc., These products are exported to Europe, U.S.A., Japan, Canada, Australia, Singapore, South Korea, South Africa and the Scandinavian countries.

The textile goods export as a major trade has led to the enormous growth of other allied industries like ginning, spinning, handloom and power loom weaving units, bleaching and dyeing units, tailoring, packaging units etc. It provides direct and indirect employment to over a lakh of persons. In the point of view of labour scarcity to the selected topic mining industry and other industry belongs to Karur district, the textile is a major causes.

**Sugar Industries**

India is one among the world’s largest producer of sugar. Parry’s pioneered sugar production in India. In 1842, the Company set up India’s first sugar factory. Since, they have maintained the edge in the industry through advanced technologies. The Parry’s Sugar manufacturing company has two sugar factories at Pettaivaithalai and Pugalur of Karur district. Apart from this the district has sugar factories at Nellikuppam, Pudukkottai Velayuthampalayam.
**Bus Body Building Industry**

The Karur District has another familiar business namely Bus Body building. In Karur district several small and large scale industries catering the need of transport within Tamil Nadu and outside of the state. The large scale industry of bus body building has the order to export the Arabic Countries. Karur is renowned centre for bus body building Industries.

**Mining Industries**

Mining Industries are one among potential industries of Karur District. According to the Mines Act 1952 Sand, precious stones, blue metal bricks of minor minerals found in Karur District and in the major minerals quartz, feldspar, and lime stone also found in Karur District.

“In Tamil Nadu a number of thick veins of white quartz occur in Karur-Dindugal belt and quartz, feldspar and limestone deposits occur in Karur, Kulithalai, Manaparai and Dindugal belts of Tamilnadu”.

“In the Karur District eighty four lease mines are operated” successfully. The major minerals of Karur District quartz, feldspar and limestones are exported to Japan, Israle, USA, Itally etc., through the intermediaries at Chennai, Hyderabad and Jaipur.

**Mosquito net Industries**

In the past 25 years, Karur has developed into the biggest centre for the manufacture of synthetic filament knitting centre. The employment potential in the industry is very good. Because, the manufacturing of filament yarn and knitting the

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19 New Find of Andalusite Geological Survey of India News No.4 (1972)
20 Sources: Primary data collected from Mining department at collector office Karur (2008).
nets requires only three months training. While the filament industry has already employed over thousands of people, there is a scope for more jobs.

In Karur District so many number of looms engaged in knitting the mosquito net from filament. To supply the basic raw materials, number of yarn manufacturing units are do their business successively.

**Banking Sector**

**Karur Vysya Bank Limited**

The Karur Vysya Bank Limited was the first commercial bank established in Karur district in the year 1916. At present it has a network of 218 branches. The bank has been rated as one of the top five among the old Private sectors Banks in the country.

**The Lakshmi Vilas Bank**

The Lakshmi Vilas bank Limited is another Old Private sector Bank was established in 1926. At present it has 192 branches in India. Besides the above native banks, number of Nationalized banks and Private sector banks were opened their branches at Karur District and rendered their valuable services.

**REVIEW OF LITERATURE**

“A Study on Working and Living Patterns of the Quarry Workers at Yannaimalai” was conducted by R. Mohandas under the supervision of Dr.J.Dhanasekar in Madurai Kamaraj University at 1979. The study aimed to analyze the living pattern of quarry workers. It analyzes the hazardous life style of quarry workers caused by their ignorance. The study reveals the steps to be taken to protect the quarry workers.
“A Study on Performance Appraisal System in NLC Limited Neyveli” was conducted by M. Mani under the supervision of V. Arunachalam, Madurai Kamaraj University at 1982. The study is attempted to evaluate the performance appraisal system in NLC Ltd. It represents the unique systems for the appraisal of performance and necessary modification to be adopted.

“A Study of Quarry Industry in Tuticorin Taluk” was conducted by Baby Saroja Irene under the supervision Dr. R. Shankaralingam, Prof. & Head, Department of Economics, Madurai Kamaraj University at 1985. The study analyzes the performance of quarry industries in Tuticorin Taluk. It is aimed to analyze all relevant problems regarding the large scale industries. The study reveals that what ought to be and what ought not to be to improve the local economy through the quarry industries.

Cutting, crushing and day to day operational problems of crushing units have been studied in the thesis titled “Working of Stone Crushing Units in South Arcot District” by A. Hyderali in the year 1988 at Annamalai University. The thesis conclude the suggestion to eradicate the day to day operational problems of crushing units alone. It does not consider the problems regarding the mining.

“A Case Study on Job Satisfaction in Neyveli Lignite Corporation Ltd.” was conducted by P. Thamilarasan under the supervision Dr. N. Shankar, Madurai Kamaraj University at 1992. The study deals with the job satisfaction of employees alone. Mining, financial and marketing problems are not considered in this analysis. It furnish the recommendations to improve the job satisfaction and to limiting the employees turnover.
The thesis titled “Magnesite Refractory Industry in Salem District- A Study on its Production and Sales performance” by R.Arunachalam in the year 1993 has analyzed the problems of production and sales other than financial, labour and legal aspects. The study ends with the suggestions to improve the production and to make sales effectively.

“Job Evaluation and Wage Structure in Tamil Industrial Explosive Ltd. at Vellore” was conducted by K. Balasubramaniam, Department of Labour studies, Madurai Kamaraj University at 1994. It deals with the lack of job evaluation and improper wage structure adopted, other than finance legal and marketing problems of mining industries. The analysis prescribes the scientific methods to evaluate the job by time study, motion study, fatigue study and to determine the wages.

An economical Analysis of stone Brick Industries in Madurai District - Tamilnadu” was done by K.Raja on October 2000, under the supervision of Dr.S.Ramasamy, Department of Rural Industries and Management, Gandhi Gramam Rural University. In this Economical Analysis, the researcher find out the unique method to calculate and to control the cost and how the industries contribute the economical growth at various levels. In addition to this, the study reveals the future manufacturing, requirement and scarcity of bricks in various stages of growing economy.

“Impact of new economic policy on small scale Industries in Dindugal District was done by A.Chandraprabha on March 2007, under the supervision of Dr.M.Soundarapandian, Department of Rural Industries and Management, Gandhi Gramam Rural University.
In this study the researcher analyze the impact of new economical policy in small scale Industries at Dindugal District. In the selected District, the small scale mining industries also analyzed in the point of view of impact of new economical policy. The study concludes that the new economical policy has adverse impact on small scale industries. The new economical policy chiefly concentrate and facilitate to large scale industries alone.

Various types of research were conducted on large scale, mechanized mining like Neively Lignite Corporation, Cuddalore Granet Mines, Chettinad gypsum mining of Dindugal belongs to Chettinad Cement Corporation Ltd. etc. No study was conducted about the manual operated, small pocketed deposit mines.

A seminar paper was presented by Mr.G.Logarachagan B.E., Asst. Manager, primary crusher cum picking plant, TANCEM, at Alangulam, under the topic “Pollution Control and Total Productive Maintenance”.

In this study the researcher analyze the problems regarding the pollution and its controlling measures. Further more the researcher analyze, how the mining units can achieve total productive maintenance. In the Conclusion the study reveals an unique concept A, B, C and D will be zero. A - For accident, B - For breakdowns, C - For complaints and D - For defects. If the mining units maintain the above A, B, C, D is equal to zero. They can easily attain the total productive maintenance.

“A Study on Environment Management Practices Adopted at B.S.C.L Magnetite Mines at Salem District” was conducted by V.R.Balachandiran, mining Engr. BSCL, Salem, for present a paper on seminar held at Salem on 2004.
The study reveals that the maintenance of pollution free environment and how the mining industries are liable to fulfill the need of Environmental Protection Act 1986. In this study the researcher deviate and list out the activities are caused for pollution. The study concludes with various methods to control the different types of pollution with at most of economy.

A circular numbered N - 11013/64/mp/99 - ccom was issued and published by Mr. O.P. Sachedeva, chief controller of minims, Indian Bureau of Mines, on behalf of Government of India ministry of mines.

In the circular the Government of India ordered to maintain the environmental protection with the classifications of land environment, water environment, air environment and socio-economic environment. To protect that environment, the circular illustrate, explain and implement certain rules.

In the year 2003 a seminar paper was presented by Mr.K.R. Kandaswamy consultant mining Engineer under the topic “Towards Revamping Mining Legislations” on the seminar held by small mine owners federation at Salem.

In this study the researcher analyze the clauses of legislative measures from one another. The researcher reveals some of legislation are not in practice, at the same time is not needed in the current technology. The researcher focuses how the Government authorities are adamantly sticking in the unsuitable traditional law. Finally the study suggest to the Government to revamp the unsuitable sections of various mining Acts.

“A Study on Mineral Conservative Mining Methods for Small Scale Mining” was done by L.Ramakrishna, mines manager, The South India Mines and
Minerals Industries Ltd., Sankaranagar, TamilNadu - 627 357. The study analyzes the various methods of mining competitively with its cost and extraction. The reveals that, how the small mines can improve themselves to modernization and technical upgradation. It suggests, the semi - mechanized mining is most suitable for small scale mining. Finally the study concludes with various methods of mining for different types of minerals, depend upon the depth, hardness, deposit location and expenditure it suggest various methods of mining.

“Problems in Prospecting of Minerals” was published by Mr.V.Gopal, state geologist, TamilNadu on current trend geology vol. - 7 - IV Indian Geological Congress, pp.309314, Today and Tomorrow’s Printers Publishers, New Delhi.

In this article the author explain the geological settings in TamilNadu. Especially the river Cauvery is geologically important on account of notable occurrences of various mineral deposits. There are no any scientific methods used to identify the deposits. The mine operators have not much of Knowledge about geological setting. There were no study was conducted. To improve the knowledge about geological setting and to chennalised prospecting they require elaborate studies in the field of mining industries. Moreover it has been proved by experience that detailed geological studies would have to be maintained even after mining has been developed in order to ensure uniformity supply and of quality. There fore the prospecting operations can be divided into pre - investment and post – investment studies for such minerals.

A seminar paper was presented in the topic “Indian Mining Rules and Regulation” by Mr.P.Swamimurthy, Regional Controller of Mines, Indian Bureau
of Mines. He explains the rules and regulation of mines from the inception. For proper exploration and extraction of minerals, updated legislation to be administered by State and Central Government. The regulation starts from the prospecting up to extraction and marketing, royalties, tax duties etc… Parliament is the sole authority to the constitution of India has empowered to make or amend laws of mining concerning to regulation of mines and development of minerals. The study concludes that, to maintain the public interest the ministry of authority must take the require steps to update the Acts.

A seminar paper was presented in the top “Cost Analysis and Price Fixation of Mineral Material of Product” by Ms. M. Thenmozhi, Faculty member, Management Division, Anna University, Madras 600 025.

The study analyzes this various methods of costing. Among those methods the researcher suggest operate costing method to this mining industries. In this study the researcher reveals the following essential characteristics to a good accounting system.

1. The accounts reveal the cost of total output and cost per unit.
2. It must discloses the breakup of total cost i.e., different elements of cost Comprised in total.
3. It helps in preparation of estimates for submission of tenders.
4. It must helps in fixing the selling price more accurately.
5. By comparing the current figures with the past results and standard cost it must provide a better cost controlling technique.
“A study on Marketing of Mineral materials” was published by S.Arumugam Lecturer management studies, Anna University, on current trend geology Vol. 12 - IV, The study analyze the problems of marketing under the following segments.

1. Market opportunity identification.
2. Demand estimation and elasticity.
3. Marketing opportunity in terms of company’s objectives and resources.
4. Selection of product line and items.
5. Manufacturing vs buying.
6. Selection of target market.
7. Developing of Marketing mix and marketing efforts.
8. Marketing information system.

The study concludes with the process of marketing starts with opportunity identification and ends with verifying the satisfaction of the customer and the company. The other intermediate activities are many in member, but the important are selection of product items, estimating demand, segmenting, targeting, deciding the promotion mix and managing the marketing efforts.

A seminar paper was presented by Mr. D.H. Victor, mining consultant Earth Science, Engrs. Administration, Madras in the topic “Extraction on small Bodies of mineral Deposits Profit Analysis” The study analyzed on the basis of two aspects namely Financial outlay and statutory obligation. The study reveals these are the two main considerations for operating a small body of any mineral
deposits. The study illustrated with the cost calculations of each process. Finally it concludes with the suggestions for development and tactual mining operation.

An articles published in Financial institutions and public Accountability GIPL 2002 volume 39 by A. Jeyaraj. Technical Officer State Bank of India, Madras - In this articles the researcher explain about the following schemes.

1. Liberalized scheme
2. Entrepreneur scheme
3. Differential Interest Rate scheme
4. Self-Employment to educated unemployed youth scheme
5. Equity Fund Scheme
6. Village Industries Scheme
7. Financial Assistance to Ex-Servicemen harijan and weaker sections.

From these schemes number of small scale industries availing financial facilities, except small scale mining industries. The study reveals that the causes for the inability of Financial availment of small scale mining industries.

Many reports have been published in mining industry. All these reports and studies have dealt with different problems of mining industry. So far no elaborate study about the working of mining units in Karur District is attempted. In this context the present study fulfills the lacuna.

**Statement of problem**

Mining is one of the potential business in Karur district and is one among the important contributors to the local economy. The unit owners have lots of opportunities to take lease for mining purpose in Karur district. In India ever since
the Mines Act 1952 to this day of Mineral Concession Rule 1960 regulations are solely intended for captive mines industries. Mines Act 1952 regulate the safety distance for blasting. It stipulates 45 meters from any railway road, bank of river or permanent structure. But Indian Bureau of Mines regulates 50 meters. How can small mines be an important contributor to the economy when the concerned legislations are not helpful and not practicable to implement?

In leasing land for mining purposes, the owners have to get clearance from the local authorities. Unfortunately the local authorities take much time in processing and giving clearance. These delays in processing the lease application affect the prospects of mine owners and in several cases they loose their orders of supply. The legislations regarding labourers are force stringent and impracticable regulations to small pocketed deposit mine owners.

They have not scientific method to assess the quality. In case of rejection by delay or low grade, the mine owners cannot arrange any other local market for their product. Due to this problem they suffer heavily. If they are not able to maintain the regular supply, the collection becomes very difficult.

The globalised problems of fuel price hike are chiefly affect this nature of industry. Because of rough material, over load, and unsuitable forest road conditions the truck operators are not ready to hire their vehicle to this industry. This situation warrants them to more expensive.

Though financial institutions and banks are lending for various Industries, the mining unit owners are not able to acquire finance from organized sources. Because of their nature of business, no banking sector provide financial assistance
to this industry. These unit owners required large amount of capital for various reasons. Specifically, to compete with the fellow owners and take on lease lands for mining they need sizeable ready money in their hands. This situation warrants them to borrow from unorganized sources at a high rate of interest.

Another major problem is the availing of labourers. Semi-skilled and unskilled labourers play a vital role in the in-pit operations. But the mining units are forced to compete with the bus body building industries, textile and cement industries to capture their own employees. The competence for procuring the labours leads to too expensive. On the other hand this industry leads to social evils like child labour and slavery. There are number of problems faced by the small mining units. These problems form the basis for the present study.

**Objectives of the Study**

1. To study the nature and working patterns of mining units.
2. To get to know the legal, technological and marketing problems of mining units.
3. To analyse the financial problems faced by mining labourers and owners.
4. To examine the labour problems faced by mine owners.
5. To identify the problems of child labour and slavery.
6. To find out the steps taken by mine operators and to suggest the effective extraction of non renewable resources.
Research Methodology

There are eighty four mining units located in different area of Karur District. According to complete enumeration method, the entire populations of eighty four mining units were studied. Data have been collected from the all mining units by using schedules, which is given in Appendix-1.

The study is based on both primary and secondary data.

Primary Data

The researcher collected primary data by using the schedules. On the basis of which the researcher interviewing the mine owners and employees. Besides, the researcher gathered data by meeting the Director, Revenue Inspector and other officials of mining department.

Secondary Data

Secondary data refers to already collected and recorded information available. The researcher collected the secondary data from IBM seminar papers, mining Association magazines, Annual reports of mining industries, Circulars and Government Orders of mining department of India and text books.

Sampling Technique

The total number of labourers is 2100 which includes 336 skilled labourers, 1260 semi skilled labourers and 504 unskilled labourers. A sample of 10 % (that is 210 employees) has been selected in each category by proportionate random sampling method.
Skilled labourers 336 x 10/100 = 33.60 Rounded off 34
Semi-skilled labourers 1260 x 10/100 = 126.00 126
Un-skilled labourers 504 x 10/100 = 50.40 Rounded off 50

2100 210

Tools for analysis

The collected data have been consolidated, tabulated and analyzed by using relevant statistical tools like, Chi-Square, factor Analysis, correlation, Regression, ANOVA an structural Equation Modeling (SEM). The SPSS 16 and AMOS 7 packages are used for analyzing the data. Tables, graphs and charts have also been used to analyze and interpret.

Limitations

The research study is not free from limitations. The mining unit owners are not properly maintaining records, and hence there were difficulties in collecting correct data from them. Some of the owners were reluctant to renewal the financial matters. In spite of this the researcher collected relevant data and used judiciously in the thesis.

The study is conducted on manually operated mines of quartz, feldspar and limestone. The study is restricted to the mines located within the boundaries of Karur district alone. Considering the societal problems of mining labourers viz. child labour, slavery, illiteracy, premature marriage, lack of family planning and poverty, Child labour and slavery alone are taken for the study.

Period of the study

The study has been conducted for a period of ten years. From 1998-99 to 2007 - 2008
Chapter Scheme

The present study consists of Six Chapters.

Chapter - I

The introductory chapter is intended to provide a brief idea of the subject matter of the thesis, nature of the topic, a brief idea about product profile, area profile, review of literature, statement of problem and objectives of the study. The methods used for collection of data, statistical tools used, limitations and chapter classification have also been detailed in this chapter.

Chapter - II

The second chapter deals with the legal and technological problems faced by mine operators.

Chapter - III

The third chapter reveals the marketing problems of mine operators.

Chapter - IV

The fourth chapter narrates the financial problems and labour problems of mine operators.

Chapter - V

The fifth chapter analyses the Mining Units.

Chapter - VI

The last chapter “RESUMÉ” consolidates all the observation made in the previous chapters. This is intended to make the whole thesis a comprehensive one with a beginning, middle and proper end.