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# ENVIRONMENTAL IMPACT ASSESSMENT ON MINING ACTIVITIES IN KARUR AND TRICHY DISTRICT

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**Abstract -** *Mining is viewed as one of the important economic activities which have the potential of contributing to the development of economies. At the same time, the environmental and health impacts of mining on surrounding communities have been major concern to governments, the general public and stakeholder organization and individuals. While the contribution of the mining activities to economic development of Ghana is well acknowledged, others contend that the gains from the mining sector to the economy is achieved at significant environmental, health and social cost to the country. Sand is an important mineral society in protecting the environment where this practice of sand and soil mining is become on environmental issue as the demand for sand increases in industry and construction. Pollution of water is evidence by the color action of water which most of the rivers and mining areas various from brownish and reddish orange low PH(2to3), electrical conductivity is high concentration of ions of sulphate and iron and toxic heavy metals, low dissolved oxygen and high BOD.The physical, chemical, biological parameters which characterize the degradation of water quality contamination of Acid Mine Drainage(AMD).*

***Key Words***: Environmental Impact, Mining Activities, Ground Water Quality.

## 1. INTRODUCTION

Mineral resources are a source of raw materials for an industry and essential components of modern day development. They are adding value to the economy and national wellbeing. But at the same time this sector also brings significant environmental and social impacts. Mining is the extraction of valuable minerals or other geological materials from the earth. In the initial stages of mine development the impact include loss of biodiversity due to forest land diversion and land clearing. Economic loss of livelihood due to displacement and diversion of agricultural land and loss local water resources. Mining is a major contributor to the national GDP (4%) occupying 36 lakh ha (0.11%). The total land area (329 Mha) and providing employment generation (4%) for 1.1 million people of India.(Ramanathan, N.L and R.Mehta(eds) 1983.The environmental effect due to mining activities include destruction of sedimentation and erosion, soil contamination, surface and ground water pollution, air pollution and waste management. The mining activities plays major role in Karur and trichy district in Tamilnadu. Hence this district is taken for the present study.

### 1.1 Scope of the Study

To control the mining activities in future generation to avoid the ground water depletion and ground water contaminations, air and noise pollution. The lease period in private sectors may be restricted and take action on illegal mining. When sand mining is concerned, the mining activities should be made up to the level of 1m construction purposes.

### 1.2 Objective

Mining is one of the most environmental polluting industry in Tamilnadu especially in Karur district. There are different types of mining industry located in Karur District and Major and Minor Minerals in large scale. Most probable effect of mining activities are air pollution, ground water contaminations, noise and vibration due to blasting. There are eight types of Major mining activities in Karur district. Mining operation has been done with approval from Tamilnadu government and got lease period of 10 to 20 years. There are many private companies applying for quarry licenseparticularly in sand mining is undertaken by public work department in government sector.

## 2. LITRATURE REVIEW

**Brindha et al.,** In this age of technological revolution several studies and investigations have been conducted by many researchers, on Tube wells, Dug wells, Bore wells etc. This leads to adverse impacts on the ground water as well as significant deterioration in the water quality throughout the world (Ramesh and Elango 2005, Brindha and Elango 2010, Brindha et al 2011, Chun et al., 2000). This chapter reviews the study on different physio-chemical parameters by using chemical analysis of Ground Water, which provide useful information for understanding the ground water behavior in the study area.

**S.C. Joshi et al.,** published a book entitled "Mining and Environment in India". Of late, the environmental effects of mining have come into sharp focus in this country. The industrial or economic gains of mining are no longer seen to provide enough compensation for the environmental damage caused by it. Taking into account the heavy

environmental cost of natural resource destruction and of rehabilitation, the income from mines land is generally not much. But it definitely transfers the benefits to the more powerful groups in society, which impoverishes the local people and generates tensions in the society.

The Water quality is an important measure for assessing groundwater and its suitability for drinking. It is the most effective tool to communicate information on the quality of any water body .Groundwater is the major source of drinking water in all the suburban areas. Drinking water is an important resource that needs to be protected from pollution and biological contamination. The water borne diseases continue to be a dominant cause of water borne morbidities and mortality all over the world, and open defecation pollutes the ground water and helps in the spread of enteric diseases.

**Sharma and Patel et al.,** Determined the Groundwater Quality Index (GWQI) for Parameters are pH, TDS, Chlorides, Hardness and Electrical Conductivity (EC) in the urban pockets of Surat city, situated in Gujarat state India. Similarly, Reza and Singh carried out water quality index rating, to quantify the overall groundwater quality for both pre- and post- monsoon seasons. Ganeshkumar and Jaideep assessed the groundwater quality in Vedaranyam, and analyzed the data using WQI; the results revealed that during the summer season water is not suitable for potable purposes.

## 3. METHODOLOGY

The descriptive methodology to delineate the ground water pollution due to mining activities has been carried out. For which the different types of mining are chosen to select arbitrary sampling of each type of mining activities. For sand mining in the River Cauvery water from Cauvery River has been collected. The one liter of sample from each major mining site has been collected at 3 locations and the same were sent to lab for testing within a day to avoid precipitation of contaminants. The samples were analysed for Physical Parameters like Appearance, Color, odour, Turbidity, Total Dissolved solids and Electrical conductivity and also analysed for Chemical parameters like pH, Alkalinity, Total Alkalinity, Total Hardness, Ca, Mg, Na, K, Fe, Mn, Free $NH_3$, Nitrate, Nitrite, chloride, Fluoride, Sulphate, phosphate Tidys test and Free residual chlorine.

The samples were tested for UV to find the captions. The parameters were tabulated and compared with potable limits of BIS standards revised. As per the standards samples found to be crossing the potable limits were delineated and discussed.

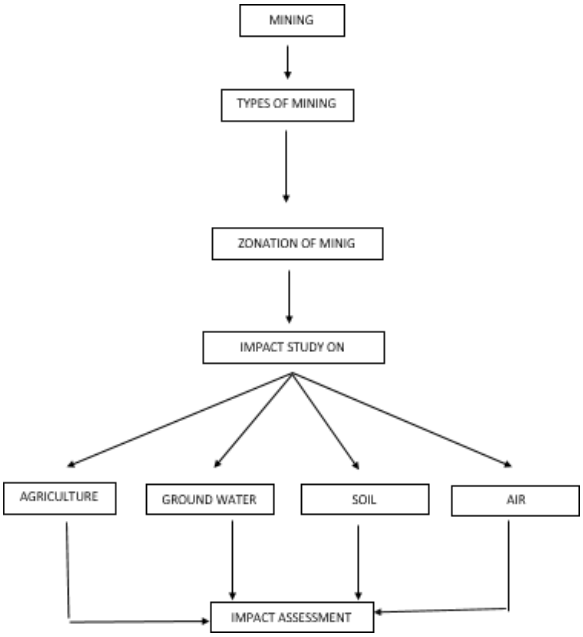


**Fig -1**: Methodology

### 3.1 Study Area

Karur district lies between 10º63′ and 11º14′N latitude and 77º90′ and 78º61′E longitude. Karur town is located on the bank of Amaravathi River. Due to discharge of effluent by the textile bleaching and dyeing units, the river and the ground water is polluted. Karur district has two Municipalities, 11 Town Panchayats and 8 Blocks. There are 203 Revenue villages with 157 Gram Panchayats present there accommodating 2457 habitations. The major livelihood activities depends on Agriculture and Textile Industries. Next to two of the above mining is the major work going on there but without employing the man power.

Agriculture sector day by day diminishing due to poor rainfall, lowering or devoid of ground water and pollution. Even though the soil types favor to the Farming the said criteria not allowing the farmers for their surveillances.

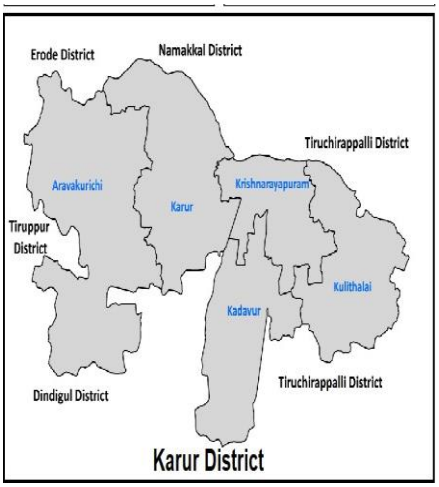


**Fig -2**: Study area location map (karur)

Tiruchirappalli is centrally located in Tamil Nadu and is 320 km away in southern direction from Chennai. The district has an area of 4509 sq.km spread over between 10 and 11.30 degree Northern latitude and 77.45 degree on the Eastern longitude. It is bounded by Salem and Perambalur districts on the North, Thanjavur and Ariyalur on the East, Pudukkottai on the South and Namakkal and Karur on the West. It is an inland district without any coast line. Tiruchirappalli is one of the oldest inhabited cities located in the center of the State of Tamilnadu. It is a famous city in South India located on the southern bank of the river Cauvery. The Rock Fort rising abruptly from the plains to a height of 83 meters in the center of the city is a famous land mark.

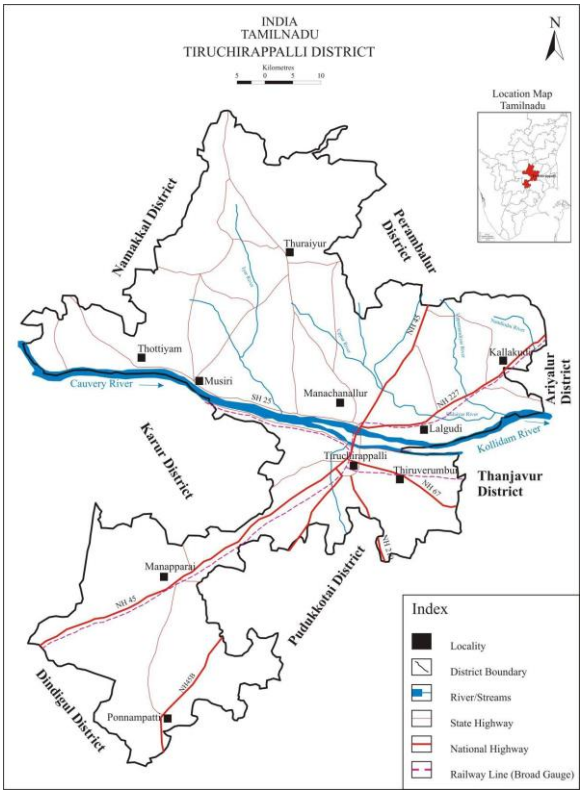


**Fig -3**: Study area location map (Trichy)

## 4. MINING ACTIVITIES

Mining is the one of the most important mineral resources to using various types of work in construction field, road work, brick work and also available in different types of mining will be classified

**Types of Mining**

1. Hard rock mining
2. Sand mining

### 4.1 Hard Rock Mining

Different type of hard rock mining will be available in Karur and trichy district it will be classified as

- Granite
- Lime stone
- Quartz
- Feldsper
- Magnasite
- Dunite
- Gravel

### 4.2 Sand Mining

The Sand quarrying is proposed to carry out by opencast Semi mechanized method. Sand is composed of consolidated felsic compound Silica and Feldspar. The sand is formed by the action of water due to transportation and erosion of Rocks sand has become a very important mineral for the expansion of society. Sand is a naturally occurring granular material composed of finely divided rock and mineral particles. River sand is one of the world's most plentiful resources (perhaps as much as 20% of the Earth's crust is sand) and has the ability to replenish itself. River sand is vital for human well-being and for sustenance of rivers. The Sand is mainly used for building construction purpose. Machineries like excavator are proposed for quarrying for a short period of this Sand up to 1m depth below the river bed. No drilling and blasting is proposed.

There is no formation of bench; the total depth of sand below the river bed is about 3m. Total depth of availability of sand is about 3m below the river bed. The proposed depth of sand quarry: 1m below the river bed. The entire Sand is excavated and utilized.

It is proposed to exploit Sand (including shoals) is about 401500 $m^3$ for a period of two years only.The sand is specifically used for construction purpose besides the Removal of the sand may also called as desilting will increase the functional efficiencies of the river during the flood season because protecting the Dwellers and vegetation on the bank of the river Nowadays sand mining quarrys are closed and reopened by TamilNadu Government.

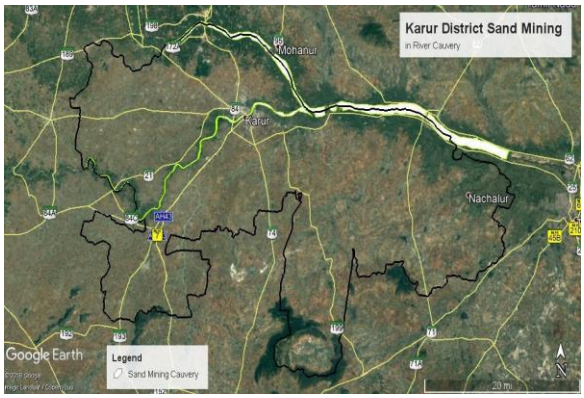


**Fig -4**: sand mining location map

**Fig -5:** field photography of sand mining in trichy (srirangam)

### 4.3 Rainfall and Climate

The district receives the rain under the influence of both southwest and northeast monsoons. The northeast monsoon chiefly contributes to the rainfall in the district.

**Table -1:** Rainfall details in karur

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Winter | Summer | South West Monsoon | North East Monsoon | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2007 | 0.900 | 0.000 | 0.000 | 37.200 | 40.300 | 36.300 | 44.100 | 76.900 | 24.000 | 171.300 | 84.400 | 215.000 | 0.900 | 77.50 | 181.30 | 470.70 | 730.40 |
| 2008 | 6.600 | 1.200 | 128.000 | 7.900 | 77.300 | 20.100 | 36.000 | 98.300 | 49.500 | 191.900 | 191.000 | 37.500 | 7.800 | 213.20 | 203.90 | 420.40 | 845.30 |
| 2009 | 2.100 | 0.000 | 3.800 | 20.700 | 50.900 | 0.600 | 0.300 | 67.200 | 98.500 | 42.800 | 257.600 | 43.000 | 2.100 | 75.40 | 166.60 | 343.40 | 587.50 |
| 2010 | 1.700 | 0.000 | 0.000 | 5.400 | 120.000 | 36.900 | 76.400 | 31.300 | 86.300 | 99.700 | 319.700 | 60.200 | 1.700 | 125.40 | 230.90 | 479.60 | 837.60 |
| 2011 | 0.000 | 3.000 | 4.300 | 105.300 | 36.000 | 8.920 | 2.350 | 90.090 | 51.900 | 202.900 | 196.000 | 23.270 | 3.000 | 145.60 | 153.26 | 422.17 | 724.03 |
| 2012 | 2.100 | 0.590 | 0.200 | 83.160 | 89.000 | 7.440 | 3.880 | 41.090 | 40.400 | 192.100 | 67.400 | 1.160 | 2.690 | 172.36 | 92.81 | 260.66 | 528.52 |
| 2013 | 0.080 | 27.060 | 4.010 | 19.210 | 47.000 | 3.440 | 0.330 | 73.450 | 99.390 | 102.020 | 72.760 | 40.330 | 27.140 | 70.22 | 176.61 | 215.11 | 489.08 |
| 2014 | 0.000 | 0.000 | 0.000 | 0.290 | 112.700 | 24.000 | 2.720 | 74.680 | 60.080 | 219.930 | 51.140 | 21.870 | 0.000 | 112.99 | 161.48 | 292.94 | 567.41 |
| 2015 | 26.280 | 0.000 | 6.380 | 124.790 | 112.150 | 38.430 | 0.000 | 32.900 | 116.660 | 92.100 | 221.160 | 68.380 | 26.280 | 243.32 | 187.99 | 381.64 | 839.23 |
| 2016 | 0.000 | 0.000 | 0.000 | 2.400 | 132.000 | 16.900 | 78.200 | 16.900 | 13.000 | 19.500 | 18.700 | 29.900 | 0.000 | 134.40 | 125.00 | 68.10 | 327.50 |
| 2017 | 17.200 | 0.000 | 49.000 | 10.200 | 68.500 | 9.8 | 43.2 | 101.1 | 182 | 87.2 | 44.7 | 102.4 | 17.200 | 127.70 | 336.10 | 234.30 | 715.30 |

Most of the precipitation occurs in the form of cyclonic storms caused due to the depressions in Bay of Bengal. The southwest monsoon rainfall is highly erratic and summer rains are negligible. Rainfall data from three stations over the period 2007 to 2017 were utilised and a perusal of the analysis shows that the normal annual rainfall over the district varies from about 620 mm to 745 mm. It is the minimum around Aravakurichi (622.7mm) in the western part of the district. It gradually increases towards eastwards and attains a maximum around Kulithalai (744.6mm).The average annual rainfall of this district is 635.68 mm. The season wise normal rainfall values are given in Table below. The district enjoys a tropical climate. The period from March to May is generally hot and dry. The weather is pleasant during the period from November to January. Usually mornings are more humid than afternoons. The relative humidities are generally between 40 and 80%. But in the period from February to July the air is comparatively drier in the afternoon. The mean maximum temperature ranges from 26.7 to 38.56 °C and the mean minimum temperature ranges from 18.7°C to 29.3 °C.

The daytime heat is oppressive and the temperature is as high as 43.9°C. The lowest temperature recorded is of the order of 13.9°C.

**Table -2:** Rainfall details in trichy

| Sl. No | Year | Total | | % Deviation (+ or r =) from Normal |
|---|---|---|---|---|
| | | Normal | Actual | |
| 1 | 1997-98 | 842.6 | 579.9 | -31.18 |
| 2 | 1998-99 | 831.7 | 1044.2 | 25.55 |
| 3 | 1999-00 | 831.7 | 850.5 | 2.26 |
| 4 | 2000-01 | 821.4 | 778.0 | -5.28 |
| 5 | 2001-02 | 887.8 | 735.2 | -17.19 |
| 6 | 2002-03 | 746.8 | 531.9 | -28.78 |
| 7 | 2003-04 | 761.5 | 1063.5 | 39.66 |
| 8 | 2005-05 | 761.5 | 976.3 | 28.21 |
| 9 | 2005-06 | 761.5 | 1266.7 | 66.34 |
| 10 | 2006-07 | 761.5 | 727.5 | -4.46 |
| 11 | 2007-08 | 761.5 | 974.6 | 28.0 |

| | | | | |
|---|---|---|---|---|
| 12 | 2008-09 | 761.5 | 974.6 | 28.0 |
| 13. | 2009-10 | 761.9 | 757.3 | -0.6 |
| 14 | 2010-11 | 813.3 | 924.8 | +13.71 |
| 15 | 2011-12 | 818.0 | 874.5 | +6.91 |
| 16 | 2012-13 | 818.0 | 562.6 | -31.2 |
| 17 | 2013-14 | 818.0 | 592.3 | 27.6 |
| 18. | 2014-15 | 818.0 | 625.7 | -23.5 |
| 19 | 2015-16 | 818.0 | 768.9 | -6 |
| 20 | 2016-17 | 818.0 | 423.8 | 394.2 |

### 4.4 Ground Water Quality

The ground water samples collected and tested for portability reveals that most of the samples are non-potable due to lowering of water table due to mining and their allied activities of draining of water through deeper bore wells near mining site.

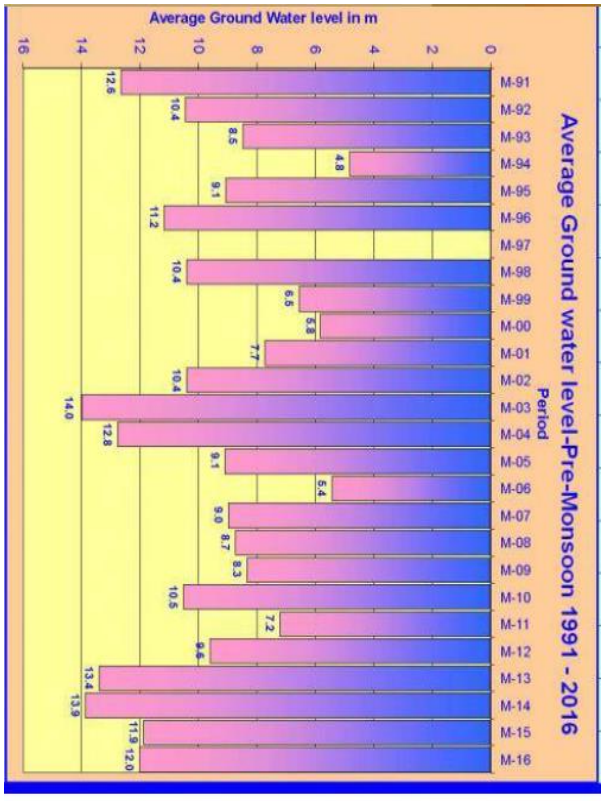


**Chart -1**:Ground water level in trichy

### 5. CONCLUSION

This project gives the mining details in trichy and karur. Mining process has lease impact on the environment since dust emission ground and surface water contaminations were controlled by effective engineering control. Transport of mining site to the factory by trucks did not cause any dust emissions due to the covering of tarpaulin covers. Air pollution caused by sand beneficiation process had no significant impact on factory and surrounding environment. Air pollution sources are provided with dust extraction systems and pollution control systems. Wash water recycling to the plant processes after due treatment by chemical processes ensured water conservation in the industry. Ground water quality become non-portable have major impact.

1. Quantity of water highly reduced bore wells drilled more than 1000ft.
2. Noise pollution is insignificant to the surrounding industry environment by beneficiation plant activities.
3. Tree plantation and green belt development in and around the industry has improved the quality of the environment at the plant premises.

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