



A STUDY OF PRE-QUARRYING ENVIRONMENTAL STATUS OF TOAP QUARRY CLUSTER IN KOLHAPUR DISTRICT BY USING GIS

Dr. Suresh Genurao Salve

Associate Professor,

Smt. K R P Kanya Mahavidyalaya, Islampur, Dist Sangli (M. S.)

ABSTRACT:

Quarry is a type of open pit mine from which rocks are extracted. Quarrying at enormous level badly influences on the topography as well as environment of area. In a whole it is disturbing the natural topographical gradient and consequently influencing the natural drainage system. Unscientific quarrying poses threat to the natural environment by creating noise, dust, land degradation and pollution. It is causing the root problem to the environment, people and ecology. Therefore it is need to study the pre-quarrying environmental status of the quarry area. Here some factors of environment i.e. Landforms, Slope, Natural Drainage, Soil and Natural Vegetation are studied by using Toposheet and GIS technology. With the help of these factors the information has been taken from the period of pre-quarry activity in the Toap quarry cluster. Toap cluster is a most important cluster of quarrying in Kolhapur region. This cluster is close to Kolhapur city and well connected to national highway therefore quarrying production is highly demanded. But here the environment before the quarrying was not disturbed by any type of activity. The landforms and slope were in natural shape and form before the quarrying. Soil, drainage and vegetation cover were in good condition.

Key Words: Quarrying, Environmental status, GIS, etc.

INTRODUCTION:

Quarrying is the primary economic activity which comes in the mining activity. Uncontrolled and unscientific practicing of quarrying in the Maharashtra, posed environmental threats to the local area from where rocks is being extracted. Further it can be triggered the regional problems such as slope disturbance, land sliding, land degradation, soil loss, hideous and disfigure landscaping. Here for the study of pre-quarrying environmental status of the

area GIS technology is used and for that Toposheet of the area is considered as a basic source of information.

STUDY AREA:

Toap cluster is a most important cluster of quarrying in Kolhapur district of Maharashtra. There are four villages include in this cluster that is Toap, Shiye, Bhuye and Kasarwadi. In present situation huge of stone production is taking place from this cluster. In this area numbers of quarries are situated. In center part of region Bhuye quarry is located at $16^{\circ} 47' 7''$ North latitude and $74^{\circ} 13' 34''$ East longitude. Where Shiye quarry is locate at $16^{\circ} 40' 46''$ north latitude and $74^{\circ} 15' 31''$ East longitude, whereas Kasarwadi quarry is located at $16^{\circ} 47' 7''$ North latitude and $74^{\circ} 16' 12''$ East longitude and Toap quarry is located at $16^{\circ} 46' 22''$ north latitude and $74^{\circ} 17' 26''$ east longitudes. The average height of this quarry cluster is 650 meters. This cluster is close to Kolhapur city and well connected to national highway therefore quarrying production is highly demanded.

OBJECTIVES:

1. To study the pre-quarrying environmental status of Toapquarry cluster by using DEM (Digital elevation model) in GIS.

RESEARCH METHODOLOGY:

For present study secondary data is used. For that Toposheet of Index No 47 L/5 (1980) is used. From this toposheetDEM (Digital Elevation Model) has been created by GIS (Geographical Information System) and then it is analyzed. This DEM is classified into the relief features for the analysis.

RESULTS AND DISCUSSION:

1. LANDFORMS:

This area is part of Sahyadrian sub ranges locally known as Jyotiba hills. The height of this region is maximum towards north which is 878 meters and

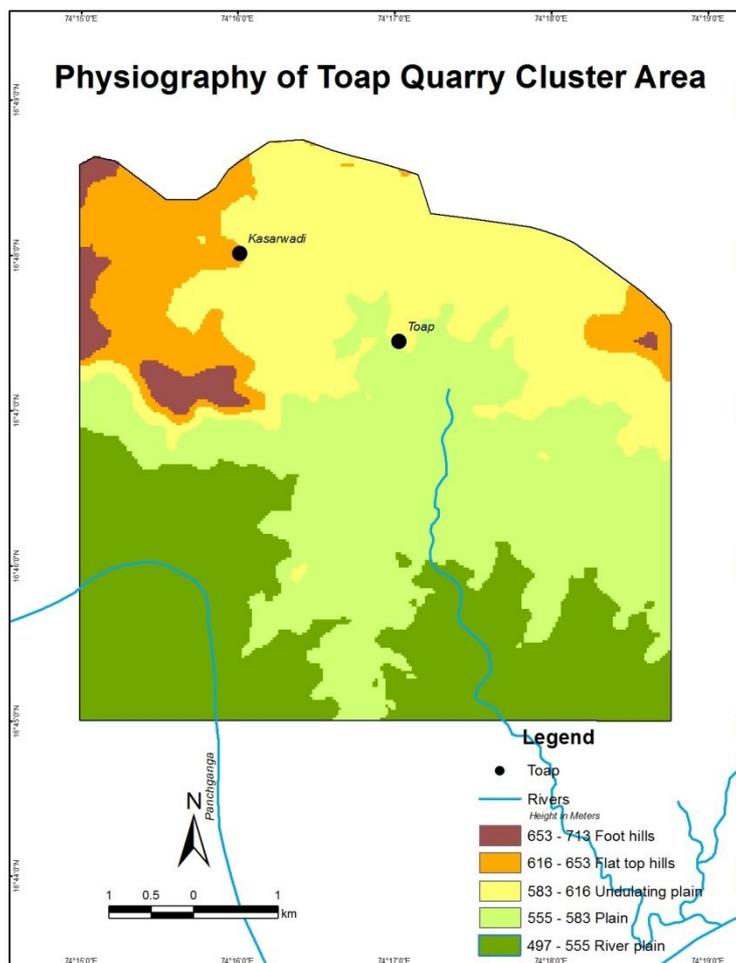
minimum towards southern part where River Panchganga is flows which is 592 meters.

Physiographically this area is divided in to five categories, river plain, plain, undulating plain, foot hills and hilly region (Map 3.4).

Table 1: Area of Landforms in Toap Quarry Cluster Site

Sr. No.	Landforms	Area in sq km	Area in percentage
1.	Foot Hills	0.94	2.27
2.	Flat top Hills	3.91	9.44
3.	Undulating Plain	10.30	24.88
4.	Plain	14.11	34.09
5.	River Plain	12.14	29.32
	Total	41.4	100.00

Source: SOI Toposheet Index No. 47 L/ 5 (1980).



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River Plain:

This landform covers the south east and south west part of the region this river plain in south west is made by river Panchganga whereas in south east by its streams. This landform has 12.14 sq km of area and covered 29.32 per cent of total area. The average height of this river plain is 550 meters. So this region is very fertile that's why agriculture practices here. Therefore this area is not suitable for quarrying activity.

Plain:

This landform is observed in the middle part of region in between river plain and undulating plain. It covers the major portion of middle part of area. This landform has 14.11 sq km of area and covered 34.09 per cent of total area. Average height of this area is 575 meters. The width of this plain decreases towards west and south. Northern part of this area adjacent to undulating plain quarrying activity is going on. In this part also agriculture is practiced.

Undulating Plain:

The erode surface of foothill was grouped under this head. The maximum area of north and north eastern part comes under this landform. It lies between plain and foothill zone. This landform has 10.30 sq km of area and covered 24.88 per cent of total area. The average height of this area is 600 meters. This area has a shallow layer of soil and hard rock structure therefore this area is ideal for quarrying activity. Now a day's major quarrying activities of this cluster practiced here.

Foot Hills:

This landform is observed in north eastern and north western part which is located in between undulating plain and hilly area. This landform has 3.91 sq km of area and covered 9.44 per cent of total area. The average height of this area is 650 meters. Piedmonts and pediments are observed in this zone. Geologically the rock of this region is very hard in nature which is favorable for quarrying activity. Now a day's quarries in Kasarwadi village are practiced here.

Hilly Region:

Hilly region is observed in north western part of area. One isolated hill is observed in north eastern part. This landform has 0.94 sq km of area and

covered 2.27 per cent of total area. The average height of this hilly region is 700 meters. This landform occupies very small area in the cluster. One dissected conical hill is observed near Shiye village.

2. SLOPE:

The Toap cluster is located on the north bank of river Panchganga therefore the general slope of this region is from north to south. In southern part it is gentle where as in North West part it is steep in nature. Because of one isolated hill in north east part there is a steep slope is observed. There are two convergent sloppy areas are observed near Kasarwadi village from which one is on north side and other is on west side. The steep slope is observed in south part of Jyotiba hill. In the area of Toap and Kasarwadi village which covered by plain and undulating plain slope is very gentle therefore this situation is very ideal for quarrying activity.

3. DRAINAGE:

In this area dendrites, trellis and centrifugal drainage patterns are observed, River Panchganga is the main river of this area flows in the south west part of region. There are two other small streams located in middle and south east part of the region. The flowing direction of all drainage system is affecting by Shiye conical hill and Tasgaon hill. All streams except river Panchganga are seasonal in character. One reservoir is observed on a small stream in the east part of this region.

4. SOILS:

The soil in this area is deep black to very shallow. As we go from river bank towards the upland the layer of soil became shallow. In river plain and plain region the soil is deep black with alluvium. Whereas on undulating plain, soil is radish brown in nature. The foot hills and hilly region have a lateric soil with very thin layer. The soil on undulating plain and foot hill is not sufficient for agricultural practices therefore quarrying activity is possible in this area.

5. VEGETATION:

In Toap cluster area deciduous and scrub vegetation are found. The vegetation cover is concentrated on the bank of river Panchganga and other seasonal streams. On Shiye conical hill open scrub is observed. This conical hill is preserved for forest. In the east part of the region reserve forest is found on Tasgaon hill.

Thus the Toap cluster as per the information physiographic environment is favorable for the quarry activity. All the above given factors giving the information about the pre-quarry activity condition of this area. It clearly indicates that its location is ideal for quarrying.

CONCLUSION:

After the study of above quarry site it is found that the natural environment before quarry activity was very healthy and follows all the natural rules. The natural environment before quarrying activity was not polluted. Basically this region is made from Basalt rock therefore quarrying activity is developed after 1990s in large numbers. It is developed mainly on the undulating plain and foot hill zones which are ideal for this activity.

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