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Suggested Uses of Abandoned Stone Quarries in and around Nashik and Pune Cities, Maharashtra

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Abstract - Quarries are one of the most common anthropogenic features observed around all settlements in peninsular India. After excavation hardly any quarry is reused. Open, unused or non-reclaimed quarries are dangerous. For the present eleven quarries in and around Pune and Nasik cities were studied. These quarries can be used in better ways if modified appropriately. These quarries can be used for commercial activities such as, aquaculture, swimming rainwater harvesting *etc.* Based on the analysis of these quarries some suggestions are made for better use of abandoned stone quarries without any damage to the environment.

Keywords - Quarry, anthropogenic features, rainwater harvesting, Pune, Nashik.

I. Introduction

Quarrying is one of the important economic activities in support of construction and allied works like house construction laying down roads and railway beds and embankments Hails (1977). It is also one of the most destructive activities of man. It is a very common practice from historic time, in the areas where massive rocks are found e.g. states of peninsular India like Maharashtra, Karnataka, and Andhra Pradesh etc. Maharashtra has very large areas of good quality building stones. The fine-grained massive basalts are good for building constructions. Deshpande (1998). To get stone and gravel for different uses quarries have been created and found around all the settlements. The number of quarries increased enormously from last two to three decades, due to expanding settlements and increase in road network. Moharir and Dikshit (1996). 'The basalts and quartzite are used as good quality road metal' Deshpande (1998). Almost all quarries are left abandoned without any further use or refilling. After preliminary observations of numbers and sizes, the abandoned stone quarries are studied during field visits in and around Nashik and Pune cities. All these quarries are in the areas of Deccan basalt.

During the field visits after conversation with local people, we found different reasons of leaving the quarries abandoned like, period of tenancy is over, economic problems or quality of the remaining stone is not good etc. We found many quarries are left abandoned from many decades without any use. e.g. In Nasik city, Malharkhan is abandoned from 50 to 60 years, Deolali cantonment quarry is abandoned from more than 40 years. And In Pune city, Pune university quarry is abandoned from 100 years and Chinchwad quarry is from 40 to 50 years.

The present paper is an attempt to study the quarry sites, their location and to identify the proper uses of them. The uses may be 'rainwater storage' by diverting the flows into the quarries. 'Freshwater fish culture' like Catla, Rohu etc., 'culture of freshwater algae' like spirogyra and chlorella that are been used as food and pharmaceutical products Etc.

II. Study Area

The study area includes two major cities of Maharashtra and the area surrounding them. These cities are Pune and Nasik. (See location map no. The locations of many quarries in Nasik are lying in southwest and south direction from the old city. Fine-grained massive basalts occupy all these locations.

III. Objectives

1. To study the feasibility of locations of the abandoned stone quarries for different purposes.
2. To identify the proper (commercial and recreational) uses of abandoned stone quarries.

IV. Methodology

1. To get information, Quarry sites have been studied with the help of the Survey Of India toposheet: - in which we have studied the locations of quarries, nearness to the major settlements. Etc.
2. Carried out field visits to observe the quarries: - The quarries are observed to know the site and situation, slope of the surface, availability of water, or nearness to water sources etc.
3. Discussion with local people: - The discussion with local people was done to understand, how long the quarries are abandoned? What are the reasons of that? How long the rainwater remains in the quarries? How they (local people) would like to use these quarries? Such information is collected from the people.

V. Quarry Sites

In and around Pune we have studied three representative quarries (table no.1) as follows:

1. Chinchwad: This site is along the Pune Mumbai highway and about 1.5 km. from Chinchwad. The quarry is abandoned since last 40 to 50 years. Where, the sewage waters is released. Now a day refilling of the quarry has been started by the municipal corporation.

2. Pune University quarry: This is abandoned from about 100 years. It is 3.5 km. from the city. In this quarry, water remains up to March or April. Students from the city do study in the peace around the quarry.

3. Model colony: This site is now in the city. It is filled by water and mentain as artificial lake.

Details of quarry(Pune)

Sr. No.	Quarry name	site	slope	Approximate size (sq.m.)
Pune area				
1	Pune University	pediment	low	300
2	Chinchwad	pediment	low	100000
3	Model Colony	pediment	low	10000
Nashik area				
1	Chambhar Lene	pediment	moderate to low	200
2	Malharkhan	pediment	low	2000
3	Ambad Vilholi hill	hillslope	moderate to low	800
4	Ambad industrial area	hillslope	moderate to steep	10000
5	Pandav Lene	hillslope	moderate to steep	1250 & 800
6	Pathardi	pediment	low	200
7	Deolali Cantonment	hillslope	low	25000
8	Eklahare	hillslope	moderate	750

Table 1 Details of quarry

In and around Nasik city, eight representative abandoned quarries have been visited. (Table no.1). The description is as follows:

1. Chambhar Lene: This site is about 7 km. from the city along Vani road. At this site numbers of small quarries are observed. It is one of the tourist places in Nasik. Number of small, gully channels are draining around the quarries but no natural storage of rainwater is found and

2. Malharkhan – This quarry is located in the city and about 3 km. from the central area of Nasik and very close to Godavari River. It is abandoned from 50 to 60 years. This site is encroached by slum dwellers and the sewage water is released in the quarry area. The water is stagnant and caused bad smelling.

3. Ambad Vilholi hill: These quarries are on hill slope. The distance is about 5 km. One site is now used for plantation by forest department. Other is left abandoned.

4. Ambad industrial area: The quarries are created on the hill slope. Distance of this site is 4 km. from the city and abandoned from 8 years. The quarries in this area are intruded by slum dwellers, the area is also known as Ramabainagar.

5. Pandav Lene: One of the tourist spot in Nasik located about 6 km. The quarries are on the hill slopes and not used for any purpose. No natural storage of water is found.

6. Pathardi: This site is along the Deolali road from Mumbai highway. It is 6 km. away from the city. It is the surface quarry in which water retains up to the month of March.

7. Deolali cantonment: This site is 2 km. away from the cantonment and located on small spur. This is abandoned from 40 years. It is one of largest quarry in the city area. The water remains almost throughout the year.

8. Eklahare: In this area the first site is Kirloskar's site, which is 3 km. from Nasik Road railway station. Where, the quarry is on the hill slope. It is abandoned from 15 years. In this quarry water remains up to the months of March and April. Second quarry is on the opposite side of the same hill at foot slopes. Here also we found water.

VI. Conclusion

After the study, we come to the conclusion that, the abandoned quarries can be used for different purposes. For e.g. hill slope quarries can be used for rainwater storage and plant nursery development etc. Surface quarries can be used to develop artificial ponds, for cultivation of algae and fishing, swimming pools and as dumping ground etc. without any damage to the environment.

Suggested uses:

The abandoned quarries can be utilized well with little efforts. The uses may vary from place to place and according to the need of the society.

1) Commercial uses (aquaculture)

i) Fresh water fishing: The quarries can be used for the commercial culture of fresh water fish like Catla, Rohu, Mrigal, Grass carp etc. or for the supply of protein rich food to the poorer section of the society. The pulses are the basic source of protein, which is not affordable to the poor people. Fresh water fish is the cheaper alternative source of the protein rich food. Fresh water fish culture in quarry ponds will provide food and it will generate the employment also. Fishing activity can be developed in the quarry like Pathardi, Deolali cantonment in Nasik and Chinchwad, Pune University and Model colony quarry in Pune city.

ii) Cultivation of algae: cultivation of algae like chlorella, spirulina, and members of cyanophyceae etc. can be done for supply of nutrient rich food for man.

1) **As a pond:** Small quarries can be developed as pond for recreation purpose. After introducing some water loving and ornamental plants. (See table no. 3) Artificial pond ecosystem can also be developed. Trees are best suited for the purpose of conservation of soil, water and air by providing the green cover. Trees provide space and shade for prosperity and proper functioning of the shrubs, bushes, climbers and all sorts of vegetation under the canopy. For e.g. Chambhar Lene

quarry, Malharkhan, Pathardi, Deolali cantonment, Eklahare in Nasik and Pune University, Model colony and Chinchwad quarries in Pune city.

2) For rainwater storage: The quarries on hill slope can be used as rainwater storage after doing continuous contour trenching on the upslope. E.g. Ambad Vilholi hill slope quarry, Ambad industrial area, Eklahare Kirloskar quarries in and around Nasik.

4) Swimming tanks: The small size quarry can be converted to swimming tanks with proper management of risk factors e.g. Pathardi, Deolali cantonment and Eklahare Kirloskar in Nasik while Pune University and Model colony quarry in Pune city.

5) Plant nursery: some of hill slope quarry can be used for the development of shade loving and water loving ornamental plant nursery.

6) As dumping ground: some larger size quarry can be used as dumping ground for rubble produced in the urban areas. This will be helpful to refill the quarry and reclaim the land again. The reclaimed quarries can be used for parking of vehicles or as playgrounds or even for the development of gardens. E.g. Malharkhan, Pandav Lene, Deolali cantonment quarries in Nasik and Chinchwad quarry in Pune.

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