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"Geo-Spatial Perceptions of Stone Quarrying Effects on Environment around Ramadevarabetta Vulture Sanctuary in Ramanagara District,karnataka".

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Abstract:

The standard of living and economic growth is determined mainly by human primary activities like agriculture and mining. Stone quarrying is also a type of mining provides various kinds of construction materials with different size and forms. The quarrying process including drilling, blasting, crushing etc. releases lot of harmful materials causes several negative effects on surrounding environment, human life and activities. Including Ramanagara district Karnataka state has rich potential in variety of building stones suitable for various construction activities. Besides this the district is known for many elevated and beautiful rocky cliffs helps in several ways. India's only endangered vulture species conservation center found in Ramadevarabetta surrounding many quarrying and crushing centers affects life and activities of man and other living organisms in surrounding area. Therefore this research is an attempt to evaluate the effects by stone quarrying activities to suggest possible control measures to minimize the effects in the study area because this activity is required for development.

Keywords: Stone quarrying, potential, endangered species, rocky cliffs, crushing centers

Introduction:

Karnataka has plenty of minerals and has over 60 varieties of stones. The stones are used in various sizes and different forms for various construction activities by providing gravels, dust, M-Sand, slabs etc. Today M-Sand is replacing the demand for river sand. The adequate supply of minerals and other products met by primary activities like agriculture and mining determines man's standard of living. Mining as an economic activity, regardless of economic benefits causes pollutions and contaminations resulted health hazards on both flora and fauna. Therefore, everyone should know the fact that "Life is more important than livelihood". Therefore this research paper tries to investigate socio-economical importance and impacts on environment as well as inhabitants around the quarry site. Complete stoppage of this activity is really impossible but need of eco-friendly mining activity and environmental awareness.

Statement of Problems:

Illegal mining is being done by the permit holders illegally extending to the surrounding area causes more problems than estimated. Recent quarry disasters caused by explosions of gelatin and detonators in various parts of the state reported in various news paper articles such as **Deccan herald news (24th January 2021)** (page2) stated that death of 5 people in the stone quarry blast at Hunsodi in Shimoga district is a testament to the magnitude of illegal stone mining in the state. Another report in **Deccan herald news (24th February 2021)** (page3) explained the death of six people by blasting gelatin and detonators at quarry in Hirenagavalli of Chikkaballapura.**Deccan herald news (24th January 2021)** (page2) stated that about 2033 stone quarry units working in 8856.22 acres across the state, in it about 309.24 acres of land under quarry in Ramanagara district. Similarly **Deccan Herald news (May 14, 2013) HTML)**Stated that for the past 7 years (2006), many villagers near Bidadi have witnessed an explosion of stone quarrying and crushing units make dangerous cracks developing in the walls of houses. In addition, stone dust is enormous damage to surrounding crops field's effects on the lives and environment around it.

In the past, quarrying was carried out by manual and would have no adverse effects on the environment. But the process of stone mining and stone crushing driven by modern technology is very dusty and noisy. The quarrying process including drilling, blasting, flame cutting, jet burners, crushing, Transportation, etc distorts the gorgeous natural landscapes and has a negative impact on the surrounding life and environment. In particular, Crushing units have a bad effect on the environment. It causes noise pollution, air pollution, water pollution, land degradation, deforestation, affects on human life, fauna and flora.

India's only vulture bird Sanctuary and the world's most endangered Vulture species, as well as the world famous Sholay rocks Ramadevara betta surrounded by many stone quarrying and crushing sites. Hence this research is an attempt to evaluate the effects by stone quarrying activities to suggest possible control measures to minimize the effects in the study area because this activity is required for development.

Research Questions:

My research topic usually has some of the following questions:

- What are the environmental problems caused by stone quarrying around Ramadevarabetta vulture sanctuary?
- Are there any negative effects on people around the quarrying site?
- Is there any adverse effect on the workers from the stone mining process?
- What are the precautionary measures taken by miners and the government to prevent the effects of mining?

Methodology:

In order to achieve the research objectives efforts were made to collect the relevant data from various secondary sources. The secondary data have collected from various pastliteratures from journals, books, annual reports and websites etc. And the available Secondary data is extensively used for the study. The research design is conceptual in nature.

- To construct a conceptual framework of research problem, the data have been gathered from various secondary sources related to research problems such as Google earth satellite images & topo-sheets (SOI) to identify the mining places, information from various relevant departments of government
- Further, a few primary data collected with use of GPS Map camera, Q-GIS tool used for mapping the study area and more vulnerable quarrying centers. Quantitative method can applied for analyzing the data.

Objectives:

My research intention is to find the problems caused by quarrying and crushing activities on natural landscapes, fauna, flora, forest, farmland, river system and impacts on life there.

1. The main purpose of my research is not only analyze the problems like noise pollution, air pollution, water pollution, impacts on livelihoods, dust cover on farmland, land degradation and deforestation by stone quarrying and crushing but also to find the problems raised by stone quarrying and crushing around Ramadevarabetta vulture bird sanctuary.

2. To investigate the probable hazards and solutions resulted from stone quarrying and crushing activities at the natural and scenic landscapes a pride of the district especially Sholay fame rocky cliffs.

3. To analyze the disadvantages of quarrying on elevated rocky hilltops in the district which are known for cause of rainfall by checking rain bearing winds and shelter for many wildlife species.

4. To analyze the health problems of livestock's by grazing of rocky dust around the quarrying and crushing centers also on crops loss.

Literature review:

The Literature review is an essential for all forms of research process. The literature review of this research has summarized information's propounded by various researchers, scholars, authors, current research texts, journals, books, dissertation works, projects, press releases, and Internet information from international, national, and regional level. It contributes to the conceptual framework of our research problem and provides the foundation for the internal and external validity of research.

Any research work requires review of literature and has the following objectives.

1. To acquire in-depth knowledge of the research subject we undertake.
2. Identification of potential areas of concern for our research topic.
3. To find out about other findings those complement our research topic.
4. To plan on the limitations in previous research and our possible contribution.

Deccan Herald news (5th April 2021) (page2) the illegal storing of gelatin sticks to use in stone quarrying activities harmful disaster happening due to illegal stone quarrying in the state.

Deccan herald news (24th January 2021) (page2) People often think that drilling and blasting in the midnight can make it sound as if someone is digging a bore well.

Vijayavani news (23rd January 2021) (page3) though 2452 illegal mining cases have been registered over the 5 years, no one has ever been convicted.

Mahesh T.P (2018) even though stone mining is economically viable, various processes in the mining cause many problems in the environment affects the social and economic conditions of surrounding residents

Dr. Kalu, Ezichi (2018) all mining processes based on the foregoing factors are mandatory and require the use of sophisticated technology to minimize the negative impacts of the mining process.

Mbuyi, M.Melodi (2017) The responsibility of government agency for re-enacting environmental management rules on such quarrying practices and mitigating environmental damage by taking action to provide relief from mine owners for affected community

Pal,S& Mandal I, (2017) Stone crushing units are currently very important in terms of construction requirements. But they found infinite number of fine particles produced by it can cause a variety of

Shivanna MB (2015) Geography is essentially a science of place-based processes and events, and a physical-cultural study of rural landscapes is essential.

Significance of study:

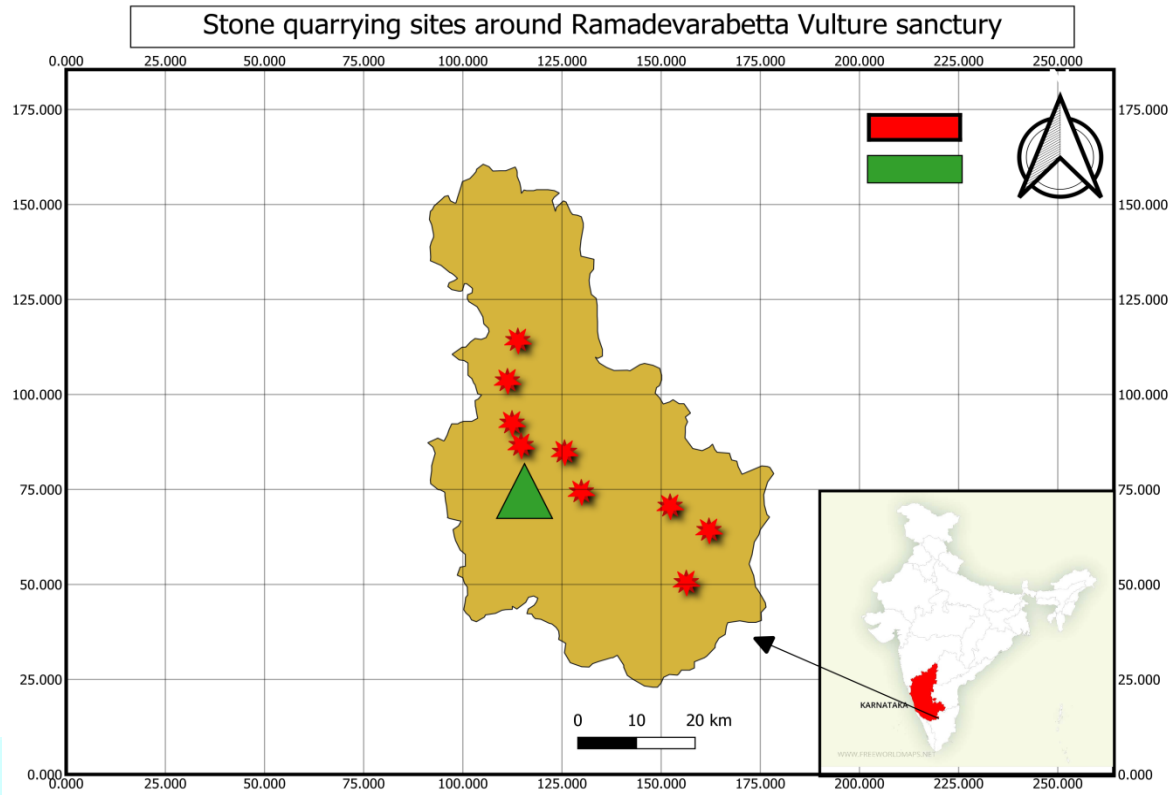
After reviewing various literatures, I have come to realize that most of the previous studies have mainly focused on the effects of stone quarrying and crushing units on vegetation and human health. This is of great importance after a long study and systematic analysis of the current research problem.

My present research project offer number of significances and it has its own importance such as;

1. This study is useful to understand how, the effects of stone quarrying and crushing on natural and artificial environments, even have much economic and social significance.
2. Natural landscapes provide a variety of advantages, and this study addresses the causes and remedies for quarrying.
3. This research shows how a natural river system loses its instability from quarrying dust.

Study area

Map generated by Q-gis software



Geographical & Geological Background:

Ramanagaram is located about 50 km from Bangalore and is geographically extended between 12º54' north to 13º53' north latitude and 75º4'east to 76º21' east longitude. The average elevation of the district is 747 meters from the above sea level and is covered by a forest of 699.46 sq km. The average annual rainfall is 854 millimeters. Present total geographical Area is about 3576 Sq km with the total population of 10.82 lakhs. The district of Ramanagar is part of the Deccan Plateau and is covered with gneiss, Close pet granite and original dike rocks of different colors, textures, and structures. The Close pet granites are the major geological feature of the district. According to official data, the district has a total of 82 building stone quarrying, 60 decorative stone mining, 42 stone crusher and 12 M-sand units are operating.

Land scapes:Ramanagar district has many large and tall granite rocky hills including the Sholay famed Ramadevara betta, Savandadurga hill, the Rewanasiddheshwar hill, the Handigundi hill, the Kabbaludurga hill, the Bilikallu hill is the most prominent ones. In addition to this, the Arkavathi and Shimsha are prominent rivers in the district and reservoirs like Kanva, Manchanabele, Vrushabhavathietc helps in the development of agriculture of about, 3710 hectares of land under cultivation in the district.

The Sholay named beautiful landscape

Stone quarrying and crushing activities near the Sholay rock

Analyzing the problem:

The main concern of this paper is to expose the impacts of stone quarrying and crushing on environment and living organisms including human activities and life such as pollution, deforestation, crop loss, stagnation of food production, disturbance to animal and birds, lack of clean air, dry up of rivers, reduced soil compaction, shortness of breath, cough, lung and skin problems, deafness, etc. The Economies ofmany countries depends on primary occupation like agriculture and mining. Quarrying activity is a type of mining process that involves the extraction of stone minerals (Jagannath v. Chavan-2002).Previously the quarrying of stone products was used in small-scale for construction of their own houses, but today large projects increased demand for construction materials has led to environmental degradation without the systematic planning. Quarry products are the most important source for construction sector providing income to the government through taxes and royalties as well as effects on countries economy by generating employment (Divya 2012).Demand for stone mining products has increased in recent years as government and other financial institutions have been funding more for building and other construction. Quarrying is of economic importance but its impact on the environment is immense (Morishit-1985). It Promoting economic activity mainly by providing gravels dust, slabs, pebbles, boulders, size stones, M-Sands etc for building constructions, road and railway lines. The prohibition on massive sandbagging due to threatens the river and riverbed, high price of sand and with a shortage of river sand,stone dust is essential for the replacement for concrete mixing. But its floating microcosms cause respiratory illnesses causing adverse effects on the lives and health of workers and surrounding communities. High concentration of stone dust increases the temperature of the environment and hinders the life of the environment. But the mining of high-value black (granite) stones is the source of the economy without much harm to the environment.

What is the problem with quarrying?

The quarrying has a positive impact on economic development by construction activities providing employment to the rural people and income to the government through royalty. But its various effects not only on the environment but also on the health of the workers and people around it, such as respiratory, skin and eye problems are more common. It also causes silicosis disease in the lungs of workers and people around the quarrying area by inhalation.

The process involves release lots of dust and noise pollutants disturb both physical and built environment. Particularly the crushing units became worst in the context of environmental concern. About 2033 stone quarry units operating in 8856.22 acres across the state out of it 309.24 acres of land under this activity in Ramanagara district. When we look at the history of disasters in the district more disasters caused by stone quarrying and crushing activity particularly in Ramanagara and Kanakapura taluks have highest number of stone quarries.

Stone dust is usually produced when the size of the stone is reduced to varying degrees. It mainly depends on the source of rocks and the crushing method. According to the CPCB 2009 report, micro-particle dust produces 1–10% of primary stage crushing, 5–25% of secondary level crushing, and 5–30% of tertiary level crushing. Similarly limestone produces 20-25%, fossil 35-40% pure igneous and metamorphic rocks 10-30%.

Following table shows the consolidated information about negative effects of stone quarrying and crushing activities around the Ramadevarabetta vulture sanctuary by 100 people randomly.

Figure 1. Respondents Perceptions

	Total %	Male %	Female %	Quarrying staff %	Non staff %	Educated %	Uneducated %
Negative impacts of Quarrying process	80	65	85	75	80	85	65
Effects on landscape observation	68	80	55	80	85	90	70
Soil & Vegetation degrade	70	76	65	68	78	80	55
Noise pollution observe	60	70	55	80	60	79	66
Air pollution observe	48	54	40	66	52	74	42
Water pollution observe	35	38	25	30	20	43	18
Effects on Vulture species	65	78	45	65	85	80	30
Rehabilitation and remedies observe	25	22	20	15	18	15	12

Stone mining process causes noise pollution result many Physiological and Psychological effects of man and other animals. Unscientific stone mining poses a serious threat to the environment such as deforestation can lead to massive soil erosion, air pollution, water pollution, degradation of land quality, and loss of biodiversity.

Therefore this research is an attempt to evaluate the effects by stone quarrying activities to suggest possible control measures to minimize the effects in the study area because this activity is required for development.

Origen, development and distribution of quarries in the district:

As mentioned in the field report of the Mysore Geological Department, the first decade of the 20th century (1905-10) in Karnataka led to increased demand for the export of monumental stones to the UK. Then the extension of market for inscription stones and tiles are notified. Later various types of stones, gravel, slab, jallipudi (M-sand) etc. are produced by stone mining demanded for various construction activities. Current estimated granite layer in the state is to be around 92,000 sq. Km out of 191773 sq. Km geographical area (Mahesh TP-2018). Presently several quarries are distributed over the state. But more number of quarrying and crushing centers found across the district.

The granite gneisses suitable for building stone products in the above mentioned area are abundant and are intended for supply of household and construction work in Ramanagar, Bidadi and Bangalore. Survey No. 142 (part) of the Aralalu Sandra village of Kanakapura taluk in Ramanagar district, a total of about 14-20 acres of government gomal land10 acres (4.0469 ha) of land in Survey No. 43 at Hosdoddi Village, Ramanagar district Ramanagar taluk

Impact on Topography

The impact of stone quarrying can have enormous variations on the topography of the land, mainly deterioration and deformation of the landscape or topography, landfills, wastes, formation of trench-like structures, the erection of rocks, formation of deep ponds, steep slopes, slope fractures, earthquakes, landslides, mudslides, landscaping disturbances and ugliness etc. Stone dust is entering into the river to reduce the amount of water in the river and also reduce the color and quality. The main reason for this is that the mineral dust dissolves in the water and increases the pH value of the water and NDVI. It results distraction of natural river system by blocking small reels of stone dust resulted in damage to the quality and yield of the plants. The quarrying dust deteriorate the natural soil by overlaying stone dust can cause enormous damage mainly to the vegetation of the surrounding area, Stone quarrying is of higher pressure on the limited soil and water resources (Stehouwer et.al, 2006). Stone Crushing is not only an effect on natural landscapes and life forms but also disturbs the life on the planet.

Impact on Human health and activities around the quarries & crushing units

Stone quarrying involved in the drilling, stone cutting, crushing and loading process resulted variety of health problems, mainly back pain, chest pain, miss carriage, varicose veins, silicosis, lung cancer, TB, premature deaths, respiratory depressions, asthma, lung cancer, heart disease, lock of concentration, irritability, headache, increasing BP, effects on nerves system, hearing loss and deafness, noise pollution, respiratory distress, cough, dermatitis, deafness in rural areas Rosie Lalzeirliani (2014). The work of stone miners is more difficult and dangerous than other workers, hence there are many disasters have been happening. The unorganized workers have low wages, lack of nutritious food, participate in extracurricular activities, spend time with family members and cannot guide and counsel their children are the major problems. Quarrying noise produced at 2 levels like rock blasting is 102.8 dB -130.4 dB and in Stone Crushing produced 97 dB-116.2 dB intensity noises. This results in physiological and psychological effects on humans and other organisms Sunitha Hebbal & G.G Kadadevaru (2017).Noise intensity was tested at a stone quarrying unit in the Bangalore district, where the noise intensity was very high during the explosion was 133 dB-156 dB,Naik

et.al, (2017). Stone dust produced by stone crushing causes many negative effects on both man and environment such as respiratory, skin, eye problems of all organisms including man, most notably in children and the elders. The stone quarrying activity reduces the grassland area to livestock as well as leading to the conflict of a traditional land use (Chizoro et.AL, 1997). Flying dust produced by mining activity can impair the photosynthesis process resulted growth, yield and quality of plants. Loss of crop productivity and livestock health also badly affected the dust. Respiration of floating microbial particles produced by stone mining is associated with lung disease and death Luca (2009). Bacterial type contaminated microorganisms have been detected in eye infections, such as those found in the student community of stone mining areas in the southeastern Nigeria(Nowgo et el).Stone quarrying causes for silicosis disease in the lungs of workers and people around the quarrying area by inhalation Jennifer Atieno Halwenge (2015).

Impacts on Natural Environment;

Water pollution, air pollution, soil pollution (land degradation), deforestation, effects on plants and animals especially on rare species due to long-term quarrying activities cause's serious environmental issues. Emission of toxic gases from machines, partial explosives and other materials such as stone dust, noise etccan affect the environment through land and water pollutionMbuyi, M.Melodi (2017).

Problems and prospects

The land deterioration, diversion of natural streams, groundwater depletion, effects on physical and cultural environment with human life and activates are badly affected by stone quarrying and crushing units. Complete stoppage of this activity is highly not possible but need of eco-friendly mining activity and environmental awareness. The poor and unsystematic methods to extract the products of stone quarrying have many disadvantages on the environment and the illness occur because they have left without proper steps taken for their rehabilitation. Mining companies have been benefited large quantities (small quantities for government) but local communities faced with negative effects. Karnataka have abundant non-metallic minerals which are beneficial for the economy. Therefore, mining should be done and solutions should be provided so as not to harm the environment. All mining processes based on the foregoing factors are mandatory and require the use of sophisticated technology to minimize the negative impacts of the mining process. The government and mine owners should build shelter belts around the mining area with growing trees to check the dust. Owners must remove the dust by repeatedly spraying the water on the dusty roads around the mining site, the government, NGOs, local communities, environmentalists should influence on mine owners to adopt environmental rules in stoneware activities. The compensation must provide in case of housing damage, agriculture crops and loss of life. Hence counsel is that it can reduce the harmful effects by selecting the action of monitoring, rehabilitation, restoration or post quarrying programs to follow the laws of the environment. Finally from the result of this study one can found that higher percentage of inhabitants favors the quarry even in some negative impacts with need of some remedial attentions.

Limitations:

The study does not concentrate on technical issues of environmental problems.

The study is confined only to the available secondary data.

This study covers very small area i.e. around Ramadevarabetta vulture sanctuary.

Conclusion:

After study of several secondary information's and my personal view on this topic it is little difficult to conclude weather the stone quarrying process is harmful to the built and natural environment or encourage to the economical development. But one can conclude with my personal observations and people's perceptions on quarry process around Ramadevara betta vulture sanctuary it may very dangerous threat on landscapes, other living organisms, human life and activities, unless eco-friendly mining activity and environmental awareness.

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