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Biodiversity Loss Due to Quarrying Activity in Central Aravalli Region Under Ajmer District

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ABSRACT: In central Aravalli region under Ajmer, Quarrying has various negative effects on the environment. It can lead to pollution of groundwater, changes in groundwater flow patterns, and degradation of stream habitats . Quarrying operations also result in the emission of dust, noise, and smoke, as well as the transportation of materials which further impact the environment . The disturbance caused by quarrying can accelerate erosion and eliminate the topsoil environment necessary for vegetation, making recolonization difficult . These negative impacts on the environment can have repercussions for both the immediate and adjacent communities, affecting safety, ecology, and aesthetics . However, it is possible to mitigate these effects through proper environmental management and monitoring plans .

KEYWORDS- quarrying, Aravalli, Biodiversity, loss, ecology, management

I.INTRODUCTION

Biodiversity and habitat destruction by restoring, enhancing and/or protecting equivalent values offsite due to quarrying in Aravalli. Such mechanisms are increasingly important in quarrying, where habitat loss may be unavoidable due to colocation of mineral resources and areas of biodiversity importance. Seeking to contribute to advance understanding of the current gaps and challenges, biodiversity offsetting required for environmental approval of different rocks and stones quarries in compliance with Aravallis a federal law that aims at protecting this biodiversity hotspot, were investigated. Both protection and restoration offsets were applied at area ratios from 1:1.1 to 1:5. Offset implementation costs ranged from ~3 to ~8% of quarry investment. The main difficulties reported by practitioners are finding suitable areas, lack of methods to calculate residual losses and uncertainties about the success of restoration. Internationally recommended best practices are partially followed with the highest adherence observed for the quarry whose environmental impact study was more detailed and provided a stronger basis for designing the offset. Results suggest that the quality of offset planning and implementation is directly related to the quality of the environmental impact assessment.[1,2,3]

II.DISCUSSION

The expansion of mining and quarrying to meet growing societal demands for minerals has the potential to directly and indirectly affect biodiversity. Direct impacts result arises from vegetation clear cut and earth and rock excavation, resulting in habitat loss and fragmentation. On the other hand, by providing infrastructure and access, as well as boosting economic and population growth, mining and quarrying can induce land-use changes in their areas of influence (Sonter et al., 2014), which, in turn, may result in more biodiversity loss.

Differently from other economic activities, notably industry, mining and quarrying feature locational constraints that often make biodiversity loss unavoidable if projects are to proceed. In addition, local communities benefiting from the services provided by biodiversity and ecosystems may also be adversely affected (Rosa and Sánchez, 2016), thereby exposing mining and quarrying projects to the attention of the general public (Careddu and Siotto, 2011).

Hence, mining and quarrying provide an appropriate setting for testing biodiversity-offsetting approaches. Evidence so far (Ekstrom et al., 2015, Rainey et al., 2015) suggests that despite the fact that conceptualization of offsets is arguably being strengthened and becoming more robust (Brownlie et al., 2013), and practical guidance is being developed (Ledec and Johnson, 2016), there are many practical challenges, a better understanding of which could shed more light on the theoretical debates about biodiversity offsets.

Central Aravallis in Ajmer have adopted offset policies that seek to balance the suppression of habitat by restoring, improving and / or protecting biodiversity values in response to the increasing loss of native vegetation and biodiversity (Brownlie and Treweek, 2016, Gordon et al., 2011, Morandeau and Vilaysack, 2012). Moreover, financial institutions have also been paying attention to the impacts and risks to biodiversity arising from the projects they finance.

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Businesses, in turn, have also taken initiatives to mainstream biodiversity (and ecosystem services) in project decision-making and in operations management. The best known such initiative is the Business and Biodiversity Offset Program - BBOP, launched in 2004 by a group of large companies and non-governmental organizations.[4,5,6]

Biodiversity offset is defined as "measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of offset is to achieve No Net Loss (NNL) or net gain (NG) of biodiversity after appropriate prevention and mitigation measures have been taken" (BBOP, 2012a, p. 13).

The basic approach to the concept of offset is to quantify the residual losses of biodiversity remaining after the implementation of measures to avoid and to reduce impacts (according to mitigation hierarchy) and then to assess the benefits to biodiversity resulting from offset activities (Doswald et al., 2012, International Finance Corporation (IFC), 2012, International Council on Mining and Metals (ICMM), 2012).

BBOP agreed on a number of principles of offsetting best practices. Under the "right" circumstances, the application of these principles is said to improve conservation outcomes from large-scale development projects and provide "much-needed funding for protected areas and similar conservation efforts" (Ledec and Johnson, 2016).

Despite the fact that offsetting is becoming a consolidated instrument in the environmental assessment process and evidence that the introduction of offsets has prevented biodiversity loss has been obtained (Gibbons, 2010), there are questions about the effectiveness and the capacity of offsets to actually counterbalance losses (ten Kate et al., 2004, Gordon et al., 2011). Such concerns include:

- (i)
  The hypotheses, approaches, and methods of calculating biodiversity offsets are controversial. There is no single metric that objectively captures the full extent of biodiversity, which itself has no universal, unambiguous definition (Bull et al., 2013, Gelcich et al., 2017).

- (ii)
  Barriers to the effective application of existing approaches, including problems of governance and lack of methods to assess the ecological equivalence between biodiversity losses and gains (Quétier and Lavorel, 2011).

- (iii)
  Actual loss is accepted in the present in return for uncertain future gains. Uncertainty of future biodiversity outcomes arise from many factors that may affect the success of both ecological restoration and ecosystem protection (Folke et al., 2004). The assumption that restoration will achieve ecological equivalence is often not supported by evidence (Maron et al., 2012, Gordon et al., 2015).

- (iv)
  Offset policies can favor, and facilitate, the loss of biodiversity (Walker et al., 2009, Bekessy et al., 2010), paving the way for a "license to trash" nature and legitimizing activities that would otherwise not to be approved (Hayes and Morrison-Saunders, 2007, Salzman and Ruhl, 2000).
  Seeking to contribute to advance understanding of the current practice of biodiversity offsetting, this study investigated recent actions adopted for obtaining government approval of different quarries in compliance with Central Aravallis a federal law that aims at protecting this high biodiversity value biome, considered as a biodiversity hotspot (Myers et al., 2000). The act establishes that suppression of native vegetation for mining and quarrying can be approved only if no viable alternative exists, as demonstrated by an environmental impact study prepared in accordance with existing requirements (Fonseca et al., 2017). In those cases, an offset is required. [7,8,9]

III.RESULTS

Quarrying is necessary to provide much of the materials used in traditional hard flooring, such as granite, limestone, marble, sandstone, slate and even just clay to make ceramic tiles. However, like many other man-made activities, quarrying causes a significant impact on the environment. In particular, it is often necessary to blast rocks with explosives in order to extract material for processing but this method of extraction gives rise to including noise pollution, air pollution, damage to biodiversity and habitat destruction.

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Air Pollution from quarrying

Dust from quarry sites is a major source of air pollution, although the severity will depend on factors like the local microclimate conditions, the concentration of dust particles in the ambient air, the size of the dust particles and their chemistry, for example limestone quarries produce highly alkaline (and reactive) dusts, whereas coal mines produce acidic dust.

The air pollution is not only a nuisance (in terms of deposition on surfaces) and possible effects on health, in particular for those with respiratory problems but dust can also have physical effects on the surrounding plants, such as blocking and damaging their internal structures and abrasion of leaves and cuticles, as well as chemical effects which may affect long-term survival.

In addition to the dust-related air pollution, quarrying also contributes to carbon emissions through the use of heavy machinery, transportation of materials, and energy-intensive stone processing. These activities release greenhouse gases, contributing to climate change.[10]

Noise Pollution from quarrying

Unfortunately, quarrying involves several activities that generate significant amounts of noise. It starts with the preparatory activities, such as establishing road or rail access, compound and even mineral processing facilities. Next is the process of exposing the mineral to be extracted and this is usually done by removing the top soil and other soft layers using a scraper, or hydraulic excavators and dump trucks. The excavation of the mineral itself will involve considerable noise, particularly is blasting methods are used. Following this, the use of powered machinery to transport the materials as well as possibly processing plants to crush and grade the minerals, all contribute even more noise to the environment.

Damage to Biodiversity from quarrying

One of the biggest negative impacts of quarrying on the environment is the damage to biodiversity. Biodiversity essentially refers to the range of living species, including fish, insects, invertebrates, reptiles, birds, mammals, plants, fungi and even micro-organisms. Biodiversity conservation is important as all species are interlinked, even if this is not immediately visible or even known, and our survival depends on this fine balance that exists within nature.

Quarrying carries the potential of destroying habitats and the species they support. Even if the habitats are not directly removed by excavation, they can be indirectly affected and damaged by environmental impacts – such as changes to ground water or surface water that causes some habitats to dry out or others to become flooded. Even noise pollution can have a significant impact on some species and affect their successful reproduction. Nevertheless, with careful planning and management, it is possible to minimise the effect on biodiversity and in fact, quarries can also provide a good opportunity to create new habitats or to restore existing ones.

Quarry Waste

Again, like many other man-made activities, quarrying involves the production of significant amounts of waste. Some types of quarries do not produce large amounts of permanent waste, such as sand and gravel quarries, whereas others will produce significant amounts of waste material such as clay and silt. The good news is that they are generally inert and non-hazardous, unlike the waste from many other processes. However, there is still potential for damage to the environment, particularly with water contamination.

For example, suspended particles – even though they are chemically inert – may imbalance freshwater ecosystems. Large amounts of solids can also exacerbate flooding, if it is dumped on the flood plains. Lastly, the accumulation of waste by-products will still need to be stored and managed somewhere that will not affect the environment in an adverse manner. Furthermore, the treatment and disposal of the waste may produce more negative impacts on the environment.[11,12,13]

While quarries can cause significant impact to the environment, with the right planning and management, many of the negative effects can be minimised or controlled and in many cases, there is great opportunity to protect and enhance the environment, such as with the translocation of existing habitats or the creation of new ones.

Beyond physical waste, water management in quarrying is crucial. Effective control of runoff and responsible disposal of wastewater are necessary to prevent contamination of groundwater and surface water sources.

Sustainable Quarrying Alternatives

Implementing sustainable alternatives to traditional quarrying methods is essential. This includes using electric-powered machinery, adopting more efficient quarrying techniques, and stricter regulations on waste management. Exploring alternative materials that are less resource-intensive, or using recycled materials, can also reduce the environmental footprint.

Impact on Local Communities

Quarrying can significantly affect local communities, leading to displacement, health hazards from dust and noise pollution, and disruption of local economies. Engagement with local communities to mitigate these impacts is crucial for sustainable quarry operations.

Post-Closure Site Rehabilitation

After a quarry is closed, rehabilitation can transform the site into wildlife reserves, recreational parks, or community spaces. This involves restoring topsoil, planting native vegetation, and ensuring the stability of leftover structures, thereby promoting biodiversity and community benefits.[14,15,16]

Regulatory Framework

Quarrying activities are governed by various environmental regulations, which mandate land restoration, waste management, and emission control. Compliance with these regulations is key to minimising the environmental impact of quarrying.[17,18]

IV.CONCLUSION

Long-Term Environmental Impact of Abandoned Quarries

Abandoned quarries can cause long-term environmental issues like landscape disfigurement, ongoing pollution, and wildlife hazards. Proper management is necessary to mitigate these risks even years after quarry operations have ceased.[19]

REFERENCES

1. National Geological Monuments. Geological Survey of India, 27 Jawaharlal Nehru Road, Kolkata,700016. 2001. pp. 65–67. Retrieved 23 March 2009. {{
2. ^ Bhuiyan, C.; Singh, R. P.; Kogan, F. N. (2006). "Monitoring drought dynamics in the Aravalli region (India) using different indices based on ground and remote sensing data". International Journal of Applied Earth Observation and Geoinformation. 8 (4): 289–302. Bibcode:2006IJAEO...8..289B. doi:10.1016/j.jag.2006.03.002.
3. ^ Kochhar, N.; Kochhar, R.; Chakrabarti, D. K. (1999). "A New Source of Primary Tin Ore in the Indus Civilisation". South Asian Studies. 15 (1): 115–118. doi:10.1080/02666030.1999.9628571.
4. ^ Chakrabarti, D. K. (2014). "Distribution and Features of the Harappan Settlements". History of India II : Protohistoric Foundation. New Delhi: Vivekananda International Foundation. pp. 97–143. ISBN 978-81-7305-481-5.
5. ^ Law, Randall (2006). "Moving Mountains: The Trade and Transport of Rocks and Minerals within the Greater Indus Valley Region". In Robertson, E. C.; et al. (eds.). Space and Spatial Analysis in Archaeology. Alberta, Canada: University of Calgary Press. ISBN 0-8263-4022-9.

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6. ^ Law, Randall (2008). Inter-regional Interaction and Urbanism in the Ancient Indus Valley: A Geologic Provenance Study of Harappa's Rock and Mineral Assemblage (PhD thesis). University of Wisconsin–Madison. pp. 209–210. OCLC 302421826.
7. ^ Vasiliev, A. L.; Kovalchuk, M. V.; Yatsishina, E. B. (2016), "Electron microscopy methods in studies of cultural heritage sites", Crystallography Reports, 61 (6): 873–885, Bibcode:2016CryRp..61..873V, doi:10.1134/S1063774516060183, S2CID 99544227
8. ^ Uzma Z. Rizvi (2010) Indices of Interaction: Comparisons between the Ahar-Banas and Ganeshwar Jodhpura Cultural Complex Archived 9 May 2016 at the Wayback Machine, in EASAA 2007: Special Session on Gilund Excavations, edited by T. Raczek and V. Shinde, pp. 51–61. British Archaeological Reports: ArchaeoPress
9. ^ "Climate of Hisar". PPU. Archived from the original on 5 May 2012. Retrieved 27 May 2012.
10. ^ "Climate of Hisar". District Administration, Hisar. Archived from the original on 27 March 2012. Retrieved 27 May 2012.
11. ^ "More snowfall in Himachal". The Hindu. Retrieved 24 March 2016.
12. ^ Gupta, S.P., ed. (1995), The 'Lost' Sarasvati and the Indus Civilization, Jodhpur: Kusumanjali Prakashan
13. ^ Cultural Contours of India: Dr. Satya Prakash Felicitation Volume, Vijai Shankar Śrivastava, 1981. ISBN 0391023586
14. ^ Sahibi river
15. ^ Google Books: Page 41, 42, 43, 44, 47 (b) Sahibi Nadi (River), River Pollution, By A.k.jain
16. ^ Minerals and Metals in Ancient India: Archaeological evidence, Arun Kumar Biswas, Sulekha Biswas, University of Michigan. 1996. ISBN 812460049X.
17. ^ Want govt to build 1600 km green wall along Aravalli, Indian Express, 24 December 2019.
18. ^ Haryana Government moots buffer zone to save Asola sanctuary, Times of India, 30 January 2019.
19. ^ Death, proof of leopard life in Asola sanctuary, Hindustan Times, 31 January 2019.