INTERNATIONAL JOURNAL FOR INNOVATIVE RESEARCH IN MULTIDISCIPLINARY FIELD
ISSN: 2455-0620 [Impact Factor: 6.719]
Monthly, Peer-Reviewed, Refereed, Indexed Journal with IC Value : 86.87
Volume - 8, Issue - 2, FEB - 2022 Publication Date: 28/02/2022

DOIs:10.2015/IJIRMF/202202013 --:-- Research Article

EFFECT OF STONE MINING ACTIVITIES ON LAND DEGRADATION IN JOTSOMA, NAGALAND, INDIA

[1]Kezhasalie Medoze, [2]Dr. Mary N. Odyuo
[1]Assistant Block Manager under ATMA Project, Department of Agriculture. Government of Nagaland.
[2]Assistant Professor, Department of Rural Development and Planning. Nagaland University. School of Agricultural Sciences and Rural Development. Medziphema Campus. 797106.
Email - [1]azamedoza@gmail.com [2]maryodyuo@nagalanduniversity.ac.in

Abstract: *The present study was conducted in Jotsoma Village under Sechu-Zubza block of kohima district, Nagaland, India. Most of the stone mining activities carried in and around the study area are done by the people from Jotsoma Community. It was observed that various environmental problems, such as the excavated site was abandoned and left as wasteland. In this process soil is eroded and land is degraded, natural river water flow is diverted and groundwater recharge is affected. Besides, the quarry sites in the study area have great problem on the management practice which can be characterized by poor mining plan, lack of ecological considerations, inadequate quarrying process and rehabilitation planning, technical and policy enforcement barriers, which aggravate significantly the degradation on the environment. Therefore, this study was conducted to investigate the adverse effects of stone mining on the stability of the land and its degradation, through the method of structured interview on 100 selected respondents.*

Key Words: *Stone mining, Stone Quarry, Land degradation, Environment, Effects, Awareness*.

1. INTRODUCTION:

India is a pioneer in the exploration, mining of commercial rock deposits and in establishing a firm base for stone industry. India, with an estimated resource of about 1,690 million cu m, comprising over 160 shades of Dimension Stone Granites (DSG), accounts for about 205 of the world resources. Of the 300 varieties being traded in the world market, nearly half of them are from India. Commercially viable granite and other rock deposits are reported from Andhra Pradesh, Bihar, Gujarat, Karnataka, Madhya Pradesh, Maharastra, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh, and others. The Indian stone industry has evolved into the production and manufacturing of blocks, flooring slabs, structural slabs, calibrated - ready to fix tiles, monuments, tomb stones, sculptures, artifacts, cobbles, cubes, kerbs, pebbles and landscape garden stones ([1]wikipedia). Nagaland is a state in Northeast India. It is also referred to as the Switzerland of the East; the exquisitely picturesque landscapes, the vibrantly colorful sunrise and sunset, lush and verdant flora, this is a land that represents unimaginable beauty, molded perfectly for a breath taking experience ([2]aldertoursntravels.com). English is in predominant use. Nagaland is one of three states in India where the population is mostly Christian. Nagaland became the 16th state of India on 1 December 1963. Agriculture is the most important economic activity and the principal crops include rice, corn, millets, pulses, tobacco, oilseeds, sugarcane, potatoes, and Fibres. Other significant economic activity includes forestry, tourism, insurance, real estate, and miscellaneous cottage industries.

Mostly the Barail sandstones are found predominantly in Jotsoma village. The Barail sandstones in Jotsoma village have better quality and economic value as compared to the sandstones found in other village. This may be for the reason that the Sandstones quarries found in the village are less weathered. Jotsoma is richly blessed with good numbers of stone quarries. Some of the Major Stone Quarry sites in Jotsoma Village are “Dzuna, Suoshutsie, Pucusakha, Churu, Tsiekhru, Phezhu, Dzudza, Dzutsie”. Besides these major stone quarries, there are many small quarries in and around the village where the mining activities are carried out. Different stone products have different price rates depending on the shape and purpose it serves. The types of stones produced from the study area consist of headstone/tombstone, stone slabs, boulders, metal size stones, cubes shaped stones in different sizes and stone dust which is used for many different purposes.

1.1. OBJECTIVE: To study the effect of stone mining on land degradation.

2. LITERATURE REVIEW:

Rock quarrying and stone crushing is a global phenomenon, and has been one of the causes of concern everywhere in the world, including the developed countries. ([3]Lammeed and Ayodele, 2010). Another major problem associated with quarrying activities is the unsystematic management of the stone and slurry waste which is generated daily in enormous quantities ([4]Zia Khan et al., 2014; [5]Prajapati, 2002; [6]Forstner, 1999). [7]Pearce, 2019, in his study on The Environmental and Socio-Economic Impacts of Mining on Local Livelihoods In Sierra Leone: A Case Study of Tonkolili District concluded that, mining practices have already caused serious social and environmental impacts in some mining areas in Sierra Leone, including Tonkolili District. These problems include land degradation, damage to water quality, pollution, and harm to livestock and wildlife biodiversity. Deposition of stone dust on soil and crops due to wind and runoff leads to degradation of soil quality and crop production. [8]Singhal *et.al.*, 2020 in their research on Environmental Impacts of Sandstone Quarrying and Its Waste: A Case Study of Jodhpur, India, concluded that major reasons for degradation of agricultural land and environment was intrusion of stone dust in the nearby environment, especially soil.

3. RESEARCH METHODOLOGY:

The study was conducted in Jotsoma Vilage in Kohima district of Nagaland State. Sechu-Zubza block was purposely selected for the study as Stone mining activities are popular in this block. Jotsoma is a village in Kohima district of Nagaland which is characterized by both big stone quarrying operation and artisanal stone mining activities in and around the village. A total respondents of 100 were finally selected and descriptive research design was used in this study.

4. RESULTS AND DISCUSSION:

The responses of the respondents regarding the effects of stone mining activities are given below.

4.1 Awareness on Stone quarry policy:

Table 4.1 Awareness of stone quarry policy in the study area.

Sl. No	Category	Frequency (100)	Percentage (%)
1.	Aware	79	79.00
2.	Unaware	21	21.00

Table 4..1 shows the awareness on stone quarry policy in the area. The table shows that majority of the respondents (79%) were aware of existing stone quarry policy in the village whereas the remaining (21%) of the respondents were unaware of the existing stone quarry policy in the village. The existing stone quarry policy in the area was the restriction of stone mining activities in rivers and streams.

4.2 Lands destroyed due to stone mining

Table 4.2 Lands destroyed due to stone mining.

Sl. No	Category	Frequency (100)	Percentage (%)
1.	Destroyed	44	44.00
2.	Not Destroyed	56	56.00

Table 4.2 shows that majority of the respondents (56%) did not experience their private land being destroyed by stone mining activities, whereas the remaining 44 per cent of the respondents experienced their land being affected or destroyed because of the stone mining activities. The land owners situated nearer to the stone quarry sites were mostly affected due to the use of big machineries for stone excavation.

4.3 Farmland covered with water

Table 4.3 distribution of respondents by farmland covered with water.

Sl. No	Category	Frequency (100)	Percentage (%)
1.	Yes	16	16.00
2.	No	84	84.00

Table 5.3 shows that majority of the respondents (84%) didn't experienced any of their farmland been covered with water. The remaining 16 per cent of the respondents experienced their farmland covered in water due to the unregulated stone mining activities.

4.4 Quarry waste and holes in the stone mining sites

Table 4.4 Quarry waste and holes in the stone mining sites.

Sl. No	Category	Frequency (100)	Percentage (%)
1.	Yes	82	82.00
2.	No	18	18.00

Table 4.4 shows that majority of the respondents (82%) agreed that heaps of quarry waste and holes filled with water were found around the stone mining sites which they shared was a major concern for the land degradation in the study area.

4.5 Run-off from stone quarries

Table 4.5 Distribution of respondents based on Run-off from stone quarries.

Sl. No	Category	Frequency (100)	Percentage (%)
1.	Yes	77	77.00
2.	No	23	23.00

Table 5.5 shows that majority of the respondents (77%) experienced run off from the stone quarries entering rivers or streams in their area.

4.6 Farmland disconnected from water source because of stone mining

Table 4.6 Distribution of respondents by farmland disconnected from water source

Sl. No	Category	Frequency (100)	Percentage (%)
1.	Yes	8	8
2.	No	92	92

Table 5.6 shows that majority of the respondents (92%) experienced/ have their farmland disconnected from water source because of stone mining activities in their area and caused major problem in agricultural activities as well as in the availability of water in the household.

4.7 Restoration of degraded land due to stone mining

Table 4.7 distribution of respondents by restoration of degraded land due to stone mining

Sl. No	Category	Frequency (100)	Percentage (%)
1.	Agree	61	61
2.	Disagree	39	39

Table 5.7 shows that majority of the respondent (61%) agreed that land which were degraded land due to stone mining were restored for different purposes as per the wishes of the land owners.

5. CONCLUSION:

From this study, it was found that majority of the respondents were aware of existing stone quarry policy in the village. Majority didn't have any of their farmland covered with water. Nearly half of the respondents whose lands were situated near the quarry sites had their land being affected or destroyed because of the stone mining activities. More than 80 per cent of the respondents agreed that Heaps of quarry waste and holes filled with water were found around the stone mining sites. Three fourth of the respondents experienced run off from the stone quarries entering rivers or streams in their area because of stone mining activity and almost all of the respondents' farmland had been disconnected from water source because of stone mining activities and therefore faced shortage of water at home and in their fields too. Nearly two third of the respondents agreed that degraded land due to stone mining were been restored by the owners as per their utility. Thus, in order to mitigate the land degradation issues due to stone mining activities, agroforestry practices should be encouraged in the mining sites for reclamation of degraded lands; awareness programs should be promoted to educate the quarry owners on safety for all workers and the village in general so that mutual understanding and co-operation can be developed in conserving and maintaining the land and other natural resources of the village.

REFERENCES:

1. www.wikipedia.com assessed on 10-12-22
2. aldertoursntravels.com assessed on 10-12-22
3. Lameed, G.A. and Ayodele, A.E. 2010. 'Effect of quarrying activity on biodiversity: Case study of Ogbere site, Ogun State Nigeria', *African Journal of Environmental Science and Technology*. **4 (**11): 740-750
4. Zia-Khan, S., Spreer, W., Pengnian, Y., Zhao, X., Othmanli, H., He, X., Müller, J., 2015. Effect of dust deposition on stomatal conductance and leaf temperature of cotton in northwest China. Water. 7 (1), 116-131.

5. Forestner, U., 1999. Introduction to environmental impacts of mining activities. In: Jose M. Azcue, (Ed.), Environmental impacts of mining activities, Springer pp 1-3. [6]Prajapati, S.K., 2012. Ecological effect of airborne particulate matter on plants. Environmental Skeptics and Critics. 1 (1), 12-22.
6. Pearce, Mansaray Samuel., Tang, Ying., Bangura, Abdulkarim., 2019. The Environmental and Socio-Economic Impacts of Mining on Local Livelihoods In Sierra Leone: A Case Study of Tonkolili District. *International Journal of Research in Business Studies and Management.* **6**(3), PP 12-18.
7. [s]Singhal, Abhishek., Geol, Sudha., 2020. Environmental Impacts of Sandstone Quarrying and Its Waste: A Case Study of Jodhpur, India. Conference: 35th International Conference on Solid Waste Technology and Management at Widener University, USA. Volume: ISSN 1091-8043