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The banking system is still hesitant on various grounds to provide credit to small and marginal farmers. So it is required to take concerted efforts to augment the flow of credit to agriculture. Facilitating credit through institutional sources – commercial banks, cooperatives and RRBs that are vertically integrated with the farmers for providing them critical inputs or processing their produce, could increase the credit flow to agriculture significantly. The provisions of mandatory lending for priority sector and the agricultural activities should continue. The banks should take the help of NGOs and local formal institutions in their lending programmes to reduce the transaction costs and improve recoveries. The financial cum consultancy approach needs to be followed. For meeting the credit needs of the poor, the programmes like linking of self-help groups (SHGs) with lending agencies are to be further strengthened. An assessment of agriculture credit situation brings out the fact that the credit delivery to the agriculture sector continues to be inadequate.

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05

ENVIRONMENT AND HEALTH ISSUES OF MARBLE MINING WORKERS IN MAKARANA, RAJASTHAN, INDIA

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ABSTRACT:

Mining has played an important role in the development of Makrana city. Mining operations in general have adverse environmental impacts if proper abatement measures are not taken. In marble mining the raw material is a gift of god, mine owners have to only excavate it and not pay for it. This has made most of the marble mine owners quite indifferent towards wastage of the mineral in the mining process. Their only concern is that the cost of excavation of ready block should remain the least. The magnitude and significance of environmental pollution caused by mining depends upon method of mining and beneficiation, smoke and gases generated from mining machines, processing plants, scale and concentration of mining activity geological and geomorphological setting of the area, nature of mineral deposit, land use pattern before the commencement of mining operations and post mining land use envisaged and the natural resources existing in the area.

Mining is essential for development, as all industries other than agro-based are mineral dependent. However, the mining has to be eco-friendly, as otherwise, mining despoliation (destruction) is most damaging to nature and society in and around mining centers. Society groups and local communities have taken several cases to courts. Such situation has arrived due to insensitivity of the mining industry. However, it is heartening to note that due to this collective pressure mining industry has increasingly realized the importance for the protection of environments by adopting positive response, of which, a few cases are cited here. The paper analysis focuses on the environmental and health impacts of mining workers.

KEY WORDS: Mining, Environment Impact, Health Impact, Environmental

INTRODUCTION:

Mineral wealth is an important asset that can be used to stimulate or enhance economic growth and infrastructure development of any country. Many countries resort to various activities to exploit natural resources. Mining is one of most activity. Consequently, mining is an important economic activity which has the potential of contributing to the development of areas endowed with the resource. Minerals constitute the vital raw materials for many basic industries and are a major resource for development. The history of mineral extraction in India dates back to the days of the Harappan civilization. The wide availability of the minerals in the form of abundant rich reserves made it very conducive for the growth and development of the mining sector in India. The fast decline of this depleting and non renewable commodity has resulted in various environmental hazards. Marble industry does have its impact on the local environment such as deepening of the mines and the dewatering have resulted in lowering of the water table. As a result the

water shortage has emerged for the agricultural and other human needs. The unscientific blasting is sometimes responsible for accidents. Unlike other industries, it does not generate much of air pollutants but the pollution caused by the mining activities is altogether of different kind. The main impact they impart is that they deform the local topography forever. Mining activities have lots of environmental and health impacts. This has emanated from the methods of operation by the mining, its effects on the natural environment as well as the people in the surrounding communities.

STUDY AREA:

The district takes its name from its principal town Nagaur, which is also its headquarters. The origin of the name is uncertain, but an old reference is available which shows that this place was formerly known as Nagapura. It was one of the chief towns of Ananta-gochar which included the regions of Harsa and Shakambhari. The district has a geographical area of 17.718 sq.kms, representing 5.18 percent of the total area of Rajasthan and ranks sixth among the district of the State. Nagaur district is located between latitude 26°25' and 27°40' north and longitude 73°10' and 75°15' east to north. It is bounded by Bikaner and Churu districts, to the east Sikar and Jaipur districts to south by Ajmer and Pali districts and to the west by Jodhpur district of which "Makrana" is located between 24°5' and 28°5' latitude and 69°5' and 75°5' longitudes. The name Makrana and marble both are famous all over the world. Marble mining at Makrana dates back to the Mugal period. It however received the early part of the twentieth century. In India most of the marble located deposits are in Rajasthan and southern Rajasthan holds important place for its large volume of marble mines and for different types of marble.

METHODOLOGY:

The study is mainly based on the primary data. The main data base is mine owner, factory owner, marble trader and the associations of marble were also contacted for their valued opinion and the real fact of this industry through personal talk with them. About 200 persons were surveyed from different marble workers. Record and report of the related Government department and corporation were also used.

ENVIRONMENT IMPACT:

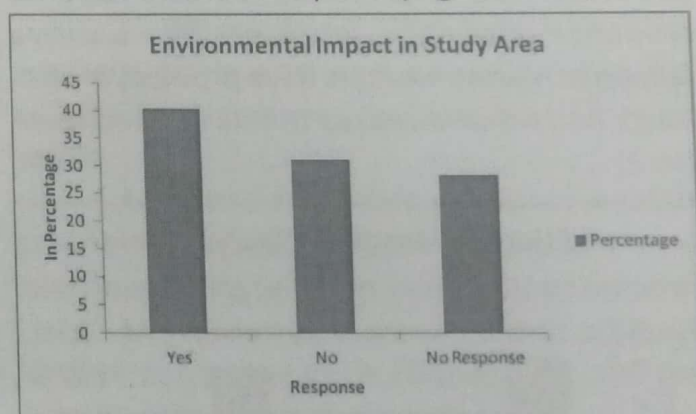
The magnitude and significance of environmental pollution caused by mining depends upon method of mining and beneficiation, smoke and gases generated from mining machine, processing plants, scale and concentration of mining activity, geological and geomorphological setting of the area, nature of mineral deposit, and land use pattern before the commencement of mining. A spurt in industrial activity in Makrana has contributed to its growth in the last decade but due to lack of proper development plan and integrated development programs, the physical environment of the town is deteriorating. There is no proper integration of industrial and mining areas with the residential and commercial areas. Slums, haphazard growth, mixed land uses, poor drainage conditions, traffic congestions and bottlenecks etc.

Table No.1: Environmental Impact in Study Area

Response	Marble worker	Percentage
Yes	202	40.4
No	156	31.2
No response	142	28.4
Total	500	100.0

Source: Based on field survey (2018)

The above table reveals poor aware about environmental impact in Makrana. All the workers have not fully aware of the environmental impact. The negative response is about 31.2 percent and positive response is about 40.4 percent. Remaining about 28.4 percent marble workers have no any response about this. The positive response of marble workers know that open cast mining, marble processing, solid waste generation and its disposal, trading and transport of marble block, slabs and irregular marble pieces. Art and craft work are important activities in Makrana mining area. Land degradation, loss of vegetation, air pollution, soil erosion, and dust pollution is environmental impact on Makrana. Main environmental hazard from the processing plants is due to the waste generated during the processing of marble. Solid marble waste powder and marble slurry are the major sources of environment degradation of the area. By this way we know that about 142 marble workers have not aware of environmental impact. (Figure No.1)



Health Impact:

Healthy and loving relationship between lessee and labour is essential for development of mine. The lessee will monitor facilities providing for labour and will do work in welfare of their labours working in mine. Drinking water will be provided by lessee and the water must be free from turbidity and contamination storage water should be kept

closed and there must be regular cleaning or water reservoir. Lesser provides proper facilities to toilet and bathroom. The labour should not go for it in open air. Helmet and safety boot will be provided to labours. Lessee will be provided first aid box with primary relief medicines for labours. In condition where labours and their family lived in mining are social welfare and child care facility required but the present mine is not too big and not much number of labours.

Table No. 2: Effect on Health in Study Area

Response	Marble Workers	Percentage
Yes	210	42.0
No	98	19.6
No response	192	38.4
Total	500	100.00

The above table reveals aware effect on health of the marble workers. The positive response is about 42 percent and negative response is about 19.6 percent have no aware about serious effect on health. Remaining about 38.4 percent marble workers have no response about the question. The positive response marble workers have problem of skin, lungs and other diseases in this work. (Figure No.2)

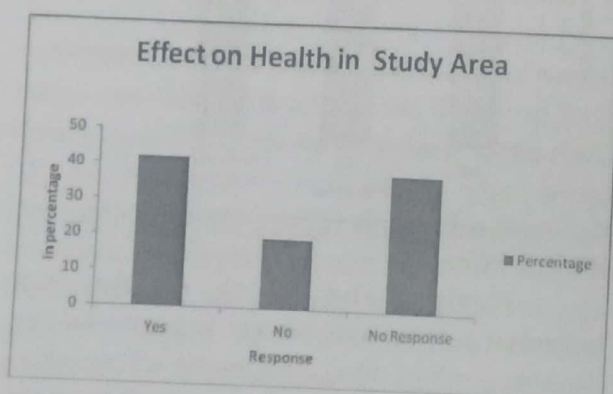


Table no. 3: Health Checkup in Study Area

Response	Marble Workers	Percentage
Yes	180	36
No	320	64
Total	500	100.00

Source: Based on field survey (2018)

The above table reveals whether the health of the marble workers is checked up regularly. The positive response is about 36 percent and negative response is about 64 percent. The positive response marble workers know the importance of good health for man and they get their health checked up regularly at hospitals. Remaining about 64 percent marble workers are not aware of their health. They go to hospital when they are ill. (Figure no 3)

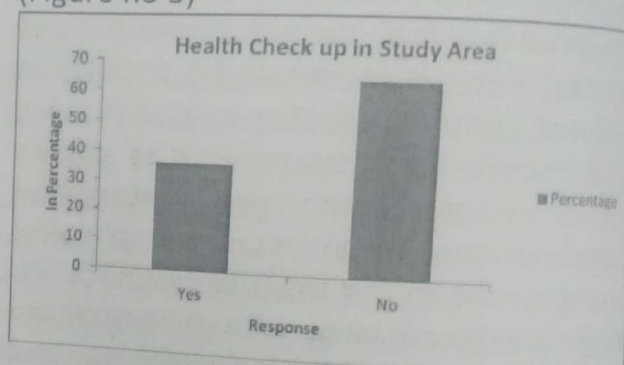


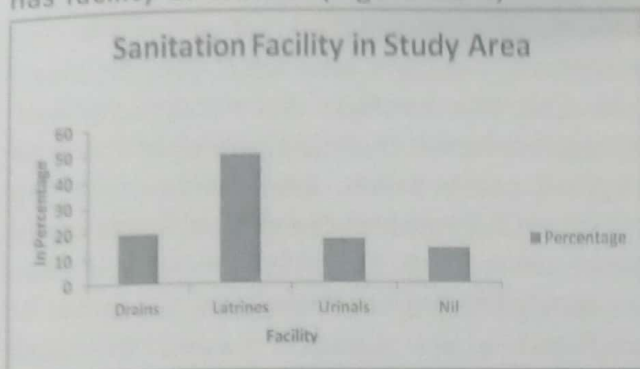
Table No.4: Sanitation Facility in Study Area

Facility	Marble workers	Percentage
Drains	96	19.2
Latrines	250	50.0
Urinals	86	17.2
Nil	68	13.6
Total	500	100.0

Source: Based on field survey (2018)

The above table reveals that the sanitation condition in the area where the marble workers reside is not hygienic. The drains facility is for about 19.2 percent marble workers and latrines facility is available for about 50 percent marble workers. The 13.6

percent marble workers have not any facility of sanitation. Remaining about 17.2 percent has facility of urinals. (Figure no 4)



Major Diseases due to Marble Industry:

The major amount of our economy based upon mining and mineral the mining industry is as ancient as human civilization. In our state various type of metallic non metallic, building and decorative minerals and stores are available abundantly and there is monopoly in some minerals like marble, feldspar, gypsum and many more. Present days mining activities care to as mining industry in which more and more people including mine owner, labors, techno orals with their technical skills come together and build a significant pillar of economy of the state as well as the nation. Because of vast and fast dispersal of mining activities various hazardous impacts on environment eco-system society developed such as loss of soil cover, blockage in natural water channels, and reduction of cat cement area of Natural reservoirs cut of trees, distinction of various types of fauna and flora species. Pollution in air, water soil which deteriorating life envelope called environments. It is moral duty of every passer to keep clean, green and pollution free environment. Because of direct connection weigh nature a mine owner should to do firm and humble efforts for doing mining with eco-friendly systems of mining.

Environmental Hazard:

Marble mining at Makrana is a classic example of unscientific mining and improper waste disposal regardless of aesthetics, proper land use practices etc. Specifically, improper waste disposal has caused land degradation, ponding and flooding of water, visual impact, loss of aesthetics, pollution, health and safety hazards. The processing waste being dumped on the riverbeds is threatening the porosity of aquifer zones and contaminating the underground water reserves. The marble slurry imposes serious threats to eco system, physical, chemical and biological components of environment. Following Problems encountered in the study area.

1. When dumped on land, it adversely affects the production and productivity of land due to decreased porosity, water absorption, water percolation etc.
2. During rainy season, the slurry is carried away to river, drains, roads and water bodies affecting quality of water resources, reducing storage capacities and damaging aquatic life.
3. When dried, the fine particles become air borne and cause severe air pollution, which have great impact on human health.
4. Apart from occupational health problems, it also affects machinery and instruments installed in industrial peripheral areas. Slurry dumped areas cannot support further restrict the vegetation growth and the flora wealth is remained degraded.

Environmental Degradation:

The ever increasing popularity of the dimensional stone of Rajasthan, growing demand for finished and unfinished product, discovery of new stone deposits, growing private and public supports for mining have led to a significant growth of stone industry in the state. As a result number of stone quarries as well as processing unit has

significantly increased. Mainly during the last two decades. While there has been a significant growth in the production of finished and unfinished stone product, there has also been a simultaneous rise in waste generation leading to deterioration in environmental quality. The mineral recovery has never been more than 25 percent. The mineral to waste (O.B. Production waste) ratio has varied between 1:10 to 1:8. The huge quantity of waste has generated which either has been back filled in exhausted area or dumped and stock piled elsewhere. Man made mountain could be seen all round the mining belt. This symbolizes the reckless mining practice degrading aesthetic values of the area and creating many environmental problems. The land and precious soil has been depleted very fast creating severe scarcity of drinking water. There has been general increase in ambient temperature. Solid waste has been the biggest polluter. In early stage of quarry development, uncontrolled blasting has created damages in the dimensional stone quarries. With the global awareness of environmental protection and financial constraints due to increasing cost of waste handling it became very essential; to upgrade the quarrying technology so as to improve mineral recovery and reduce generation of waste, to reclaim the degraded land and rehabilitate the waste dumps by cleanse a forestation and regenerate a green environment.

As a result, an urgent need is being felt to make this industry environmental friendly and environmentally sustainable. With the global awareness of the environmental degradation, there is increasing pressure on the mining industry to restore the ravage done by the open cast mining. The so called 'green society' will play a major role in the next decade recycling, conservation and preservation will be a way of life.

Land Degradation:

Land degradation is the most serious environmental impact of mining. Surface mining, apart from causing air and water pollution, renders the land the land use potential. The mining of marble like any other mineral deforms the topography of the area beyond restoration. Main reasons being unsystematic mine waste disposal and closely clustered mining. Since the excavated sites are rarely filled up or reclaimed, a number of artificial scars (waste heaps of huge dimension and deep depression) get developed. These scars cause a permanent damage to the topography and are also hazardous from the safety point of view. Once a mine is abandoned, it leaves a huge pit, which could be of no use much to the agony of the local dwellers. These pits left as such and there are no rules for restoring them. The degree of land damage varies with the topographic setting in which open mining is carried out, type and dimensions of the deposit being mined and climatic conditions. Also these variables influence reclamation techniques and rate at which surface of the mined area can be effectively reclaimed.

Loss of Vegetation:

For purposes of the marble mining the land has to be cleared of any undergrowth, bushes, etc. and the trees may have to be felled. Likewise the preparation of necessary approach may also involve a certain amount of damage to the vegetation. The loss of vegetation will depend on the location of the mining areas, scale of mining operations, the mining methods and the degree of mechanization adopted. The closed cluster mining in the region has significantly contributed towards the removal of available vegetation cover. It is also observed that for various reasons, stated above, the productivity of the surrounding land where the mining has been done is reduced to great

extents. The fine particulate matter, which forms a layer over the soil, reduces the fertility of the area. Being open cast mining, the topsoil of the area, which is very fertile, has to be removed and it is mixed with debris. Though there are rules regarding the collection of the topsoil and replenishing it on the same area, once the mine is abandoned but the time period between the start and the abandoning of the mine being too long, the provision is never practiced.

Air Pollution:

The airborne particulate matter is the main pollutant contributed by the mining and the mineral dressing processes. Particulate matter is carried in the atmosphere due to wind action over mineral and waste dumps as well as tailing disposal areas. Apart from the fine size solid particles resulting during drilling and blasting, the particles, which are most hazardous from human health and environment point of view, are those with a diameter less than "5" microns. Smaller the diameter of the particle longer, it takes to settle down from the air; thus it has potential for more wide spread and long term effects. The machinery used in the mining activities generates pollution in the form of noxious gases. Main machinery generating air pollution at the mine site is diesel generating sets.

Dust Pollution:

The various processes of the marble mining like drilling, sawing, blasting loading and transportation etc. generate considerable amount of fine dust at the mine sites. Since the marble in the region of south Rajasthan is siliceous in nature, it also generates silica particles, which are very harmful to the health of mine workers and persons living in the vicinity area. Although no study for the purpose has been made, but the survey conducted by the author infers that most of the local population generally complains

about eye irritation and asthmatic symptoms due to the impact of high SPM (Suspended Particulate Matter) in the mining area. This SPM may be so small that it remains in the air for long periods and can be transported to great distances by the wind action. Moreover, the fine dust powders also mar the growth of vegetation around the mine sites and the vicinity area.

Water Pollution:

The extent of water pollution due to mining of marble is not much. Main reason for this is that first of all, marble, which is basically CaCO_3 , is non-toxic, even if small amounts of this reaches in the human bodies it is not much harmful. Second reason is that no big water canal or river or other source of water flows near to any of the marble mining operation of Makrana. The biggest wrong done to these by the marble mining operations is that these are continuously losing their water.

Changes in Ground Water Levels:

Unplanned and gradual deepening of the mining activities generally influences the hydro-geological conditions, especially change in sub-surface water flow system, reduction in recharge intensity, lowering of water table, drying of existing aquifers etc. Large-scale land transformations significantly reduce ground water recharge areas. Further continuous dewatering of pits facilitates the working in the mine. These mine pits being the lowest lying location in the area. In many areas like Makrana it has emerged as a major problem for the local dwellers.

Conclusion:

The Dimension stones industry has an extreme high percentage of waste generation. Most of the processing plants of marble are located in the industrial areas and are operated by electricity. Main environment hazard from the processing plants is due to the waste generated during the processing of

marble. Solid marble waste powder and marble slurry are the major sources of environment degradation of the areas where marble processing units are located. Marble slurry is a suspension of marble fines in water, generated during processing, polishing etc. The wet slurry generated by the processing plant is diverted to a sedimentation tank. In major number of the industries the settled slurry is pumped out into adjacent agricultural land and left to dry there. Many of them dump the slurry in vacant forest areas or on the roadside.

Marble industry has a great contribution to state income. However, there are some potential risk of such types of industry lying on the environmental, which requires attention, mitigations, and proper management to existing human health and other natural resources. Results indicated that marble industry has human impacts with major long term environmental risks. However, each aspects needs an intensive evaluation to determine the certain norms to regulate their action and to control the possible impacts. However, new units must be established within environmental protection laws to prevent local and surrounding community. On the other hand, existing units have to introduce mitigation actions to minimize gradually the environmental impacts through providing proper managements relevant to environmental standards.

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