

Impacts of River Sand and Gravel Extraction and Stone Mining on Land use Pattern, Ground Water Level and Human Health in the Region of Nangal Choudhary Tehsil of Mahendergarh District, Haryana

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Abstract

Growing needs for infrastructure and accelerated development activities in the region of NCR for last two decades have imposed immense pressure on construction material like river sand, gravel and stone. Indiscriminate extraction of sand and gravel in Krishnawati river and mining of stones in Arawali hills in the region of Nangal Choudhary is most disastrous and threatens to the ground water level and human health. The present study examines the impact of river sand and gravel extraction and stone mining and crushing on land use pattern, ground water level and human health.

KEYWORD : NCR, Extraction, Mining, Crushing, Water Level.

Introduction:

A remarkable progress in built-up area and infrastructure development in NCR like Delhi, Gurugram, Manesar, Bawal, Rewari etc. depend upon Nangal Choudhary region to meet the ever growing demand of construction material for housing, commercial complex, new highways, to add more lines to highways, railway lines and other infrastructure projects. It is almost impossible to meet with the need of infrastructure without sand, gravel and stone in any area. Sand mining is taking place at a much faster rate than natural replenishments. Excessive sand and gravel extraction, stone mining and crushing of stones lead to alteration in topography of rivers and hills and affect local ecosystem. Dust emitted by stone mining and stone crushers create health hazards to the surrounding population causing respiratory diseases, skin and eye problems. Due to sand and gravel washing, groundwater level is decreasing rapidly and causing non availability of groundwater for irrigation and drinking. There is increase in quantity of fluoride in groundwater due to decrease of ground water level. The problem of waste of stone mining and dust has become devastating to the landscape around mining and crushing area and adversely affects visibility, reduce growth of vegetation and agriculture crops. The unscientific mining of stones poses serious threat to the environment, reduction of forest cover, increase of waste land, erosion of soil and adverse effects on human health.

Study Area:

Nangal Choudhary tehsil, the part of Mahendergarh district in South Haryana which shares boundary with Narnaul tehsil of Mahendergarh district and three districts of Rajasthan namely Alwar, Jaipur and Sikar is the center of study. It has geographical extension between 27° 53' 58" to 28° 17' 50" North latitude and 75° 12' 35" to 76° 24' 40" East longitude. The study area is mainly occupied alluvial and sand plains surrounded

hillocks and elliptical hills are prominent features Arawali ridges. Arawali hills in the region are raised up to 652 mtrs. The study area has semi- arid climatic conditions with hot summer and cold winter and its natural topography is affected by sand and gravel extraction in Krishnawati river and stone mining and crushing in Arawali hills. Average precipitation in the area is 570 millimeters (22 inch), average summer temperature is 38°C and average winter temperature is 4°C but maximum temperature in summer reaches 47°C and minimum temperature in winter drops to 0°C

Objectives:

The objectives of study mainly focus on effects of sand, gravel extraction and stone mining and crushing on land use pattern, ground water level and human health in specified area. It aims to reach following objectives:

1. The change in pattern of land use because of sand, gravel extraction, stone mining and crushing.
2. The adverse impact of stone mining and crushing on human health.
3. The adverse impact of stone mining, crushing and sand and gravel extraction on ground water level.

Data Collection and Methodology:

The assessment of ecological effects, decrease in ground water level, change in land use pattern, effects on human health of stone mining and crushing are the prime focuses of the study. Data have been collected by the Department of Mining and Geology, Haryana. Ground water level data have been collected from Central Ground Water Board (North Region), Chandigarh. For fluoride quantity in ground water, a sample survey was conducted in ten villages namely Musnota, Mulodi, Golwa, Sirohi Bahali, Akoli, Sareli, Kamania, Khatoli Ahir, Dholera, Meghot Halla, Nangal Dargu. Data on effects of stone mining and crushing on human health have been collected from CHC Nangal Choudhary and PHCs of villages of Nangal Choudhary tehsil.

Dynamic Change in land use:

Because of the consequences of economic and social activities of human beings related to nature, there is a dynamic change in land use. The cultivated land area has witnessed major changes in land use because of sand and gravel extraction and stone mining and crushing. Cultivated area is being converted in residential built up area and crushing zones.

Following results have been concluded on the basis of land use data for two different years 2005-06 and 2014-15 in Nangal Choudhary tehsil of Mahendergarh district:

Sr. No.	Categories	2005-06(sq.km.)	2014-15(sq.km.)	Difference(sq.km.)
1	Agriculture land area	330.30	320.10	-10.2
2	Forest	6.19	5.25	-0.94
3	Built up area	10.42	22.39	+11.91
4	Waste land	4.62	5.59	+0.97
5	Grass and Grazing	8.47	6.67	-1.8
Total		360	360	

The study shows that there has been a dynamic change in land use. There is decrease in agriculture land area, forest area and grass and grazing area. There is increase in built-up area and waste land.

Impacts of Mining and Crushing on Human Health:

Stone dust of crushers and mines pollution leads to various health risks like respiratory ailments, pulmonary problems, pneumoconiosis, skin and eye problems. Human beings are exposed to inhalation of silica bearing dust developing Silicosis disease a fatal lung disease. Data collected from various villages found pulmonary problems like chest pain, cough, asthma, wheezing and shortness of breath among villagers. Mining and crushing are main cause of noise pollution because high level explosives are used for blasting. Blasting generates instantaneous and impulsive noise. The noise level near blast is 120 db(A). There is ample evidence to show that air pollution causes of sleep disturbance, irritation, stress, tension, distraction and heart diseases. Due to washing of sand and gravel, ground water level downs and it causes to increase in quantity of fluoride in water. Quantity of fluoride in water more than permissible limit causes many diseases like dental and skeletal, fluorosis and thyroid problems. In above mention area, fluoride quantity in ground water is between 1.4mg/ltr to 7.8mg/ltr which is greater than permissible limits.

Sr No.	Village name	Fluoride concentration in mg/ltr
1.	Akoli	3.8
2.	Dholera	4.3
3.	Kamania	3.2
4.	Meghot SHalla	5.7
5.	Mulodi	7.8
6.	Kanwi	5.9

Impact of sand and gravel extraction on ground water level:

In the region of Nangal Choudhary sand and gravel extraction and mining started 1980s which resulted in damage to ecology and ground water resources. There requires a large amount of water for washing gravel. The average depth of water level has declined from

18.4 mtr. in 1975 to 97.5 mtr. in 2015. It indicates that water level has declined with an average rate of 1.98 mtr/year because of the over withdrawal of ground water for various use in mining and washing of gravel. This is the area where many illegal washing plants are active. The present study reveals that the basin of Krishnawati river in Nangal Choudhary has been degraded significantly on account of sand and gravel extraction. It has been observed that sand and gravel acts as sponge which helps in recharging the water table and once this layer is removed, the hydrodynamic of the riverbed get disturbed. As sand is extracted rapidly through mining the riverbed loses its ability to hold water and this leads to reduction in groundwater recharge.

Conclusion:

The study reveals that the area is very highly affected by stone dust of mining and crushers. In Krishnawati river basin, the depletion of groundwater resources at a very fast rate is a matter of great concern. The squeezing river bed and increasing of stone mines and crushers indicate that extraction and mining activities are encroaching rapidly on other land use categories. Now it is compulsory to establish environment management system which includes dust management plan and regular environment audit and monitoring. Construction of wind breaking walls, construction of paved road within crushers premises, green belt around crushers and mines are essential. Fine dust powder in crushers area should be removed periodically. It is compulsory to ban all washing plants of gravel on ground level.

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