Impact of mining activities on the socio-economic status and water quality of Kolayat mining area, Bikaner (Rajasthan)

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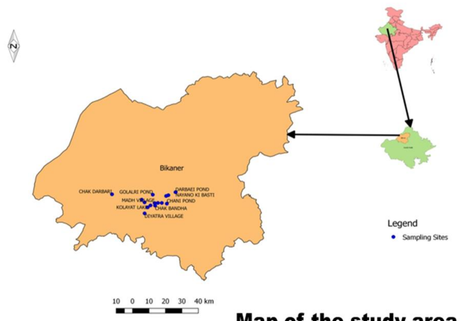
OBJECTIVES

- The present study was conducted to survey the people's perspective on the socio-economic impact of gypsum mining in the Kolayat area Bikaner (Rajasthan) with special reference to air pollution, biodiversity, health issues and impact on the culture and tradition due to gypsum mining.
- The impact of gypsum mining on the water bodies in and around area was also tested to find the quality of water which is the livelihood sustainability in that particular area.

MATERIALS ANS METHODS

- The study was done during January 2018 to March 2018. Water sampling was done at selected sites.
- Total 16 samples of surface water and groundwater were collected from 16 locations of Kolayat and they were analyzed for assessing the physicochemical parameters.
- A Questionnaire was prepared for the socio-economic survey of the study area and it was done with 70 local people.



Map of the study area

Sampling sites and their GPS locations

Sample code	Latitude	Longitude	Location	Water Type
S1	27°50'23.16"	72°52'20.32"	Kolayat lake	Surface water
S2	27°52'39.16"	72°55'53.79"	Madh village	Surface water
S3	27°29'02.54"	72°50'44.96"	Dasori village	Surface water
S4	27°47'08.36"	72°50'46.84"	Diyatra village	Surface water
S5	27°57'09.03"	72°54'55.56"	Golalri pond	Surface water
S6	27°56'52.65"	73°02'50.51"	Gajner pond	Surface water
S7	27°58'30.06"	73°06'30.27"	Darbaei pond	Surface water
S8	27°52'44.77"	72°57'32.16"	Kotri village	Ground water
S9	27°58'29.77"	73°06'33.92"	Nayano ki basti	Ground water
S10	27°52'43.30"	72°59'30.86"	Inda ka bara	Ground water
S11	27°52'21.56"	73°02'05.76"	Chani pond	Surface water
S12	27°56'27.62"	73°01'43.50"	Chandasar pond	Surface water
S13	27°54'29.79"	72°49'16.99"	Gura mining site	Ground water
S14	27°52'56.46"	72°04'26.44"	Chak banda 2	Ground water
S15	27°57'22.16"	72°34'11.56"	Chak darbari	Ground water
S16	27°51'19.26"	72°56'06.37"	Chak bandha	Ground water

RESULTS

- Turbidity ranges from 0.6 NTU (S11 near chani pond) to 2.4 NTU (S13 Gura mining site).
- TDS ranges from 320 mg/l (S6 chak banda) to 830 mg/l (S5 golalri pond). Sodium ranges from 0.75 mg/l (S4 diyatra pond) and 24.8 mg/l (S8 kotri village).
- Potassium ranges from 113 mg/l (S6 gajner pond) to 247 mg/ l (S5 golalri pond).
- The range of the chloride was from the lowest 118 mg/l (S6 gajner pond) to the highest 283 mg/l (S11 chani pond).
- Alkalinity was found from 112 mg/l (S15 chak darbari) to 255 mg/l (S2 madh village).

Range of Physico-chemical parameters of water samples in kolayat

Parameters	Range	Minimum	Maximum
pH	6.5-8.7	S8 kotri village	S11 chani pond
EC	1.34-2.98 dS/m	S13 gura mining site	S14chak bandha2
TDS	320-830 mg/l	S14 chak bandha 2	S5 golari pond
Turbidity	0.6-2.4 NTU	S11 chani pond	S13 gura mining site
Alkalinity	112.4-255 mg/l	S15 chak darbari	S2 madh village
Cl	118-283 mg/l	S6 gajner pond	S11 chani pond
DO	0-4.9 mg/l	S5 golari pond	S16 chak bandha
COD	18.6-90 mg/l	S10 indra ka bada	S5golari pond
Na	0.75-24.8 mg/l	S4 diyatra pond	S8 kotri village
K	113-247 mg/l	S6 gajner pond	S5 golalei pond
BOD	1.3-3.0 mg/l	S3 Dasori village	S 16 chak bandha
Total hardness	211-354 mg/l	S7 dasori pond	S11 chani pond

Environmental issues attributed in Kolayat mining area (Bikaner)

S.No.	Parameters		% of People
1.	Environmental issue attribute due to mining	Yes	92%
		No	8%
i.	Quality of water	Good	26%
		Bad	54%
		Fair	20%
ii.	Change of colour	Changed	45%
		Unchanged	55%
iii.	Water pollution is a major environmental problem due to mining	Yes	88%
		No	22%
iv.	water pollution due to mining	highly polluted	72%
		not polluted	28%
2.	Issue related to air		
i.	Quality of air	Good	18%
		Bad	78%
		Fair	4%
ii.	Changed in the average temperature	yes	72%
		No	28%
iii.	Diseases due to air	yes	84%
		No	16%

Socio-economic status of Kolayat people

Parameters		Percentage of People
Gender	Male	78%
	Female	22%
Age Group	20-30 years	24%
	30-40 years	45%
	40-50 years	31%
Education status	No formal education	34%
	8th class	28%
	Secondary	32%
	Bachelor	6%
Economic status	100 INR/ Day income	37%
	>100 INR/day	45%
	<100 INR/day	18%
Employment status	Employed	54%
	Unemployed	34%
	Retired	12%
Source of Income	Agriculture based	22%
	Mining based	65%
	Other works	33%

- From the survey, 40% cases of respiratory problems were noted.

CONCLUSIONS

- It was found that earlier health issue was more prevalent in madh village while health is improving nowadays with the help of government initiatives. Hence, the present study deals with public health and water management at local level.

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