

## Spatio Temporal Analysis of Brick Kiln Industries

### “A Case Study of Bassi Tehsil of Jaipur District”

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#### Abstract

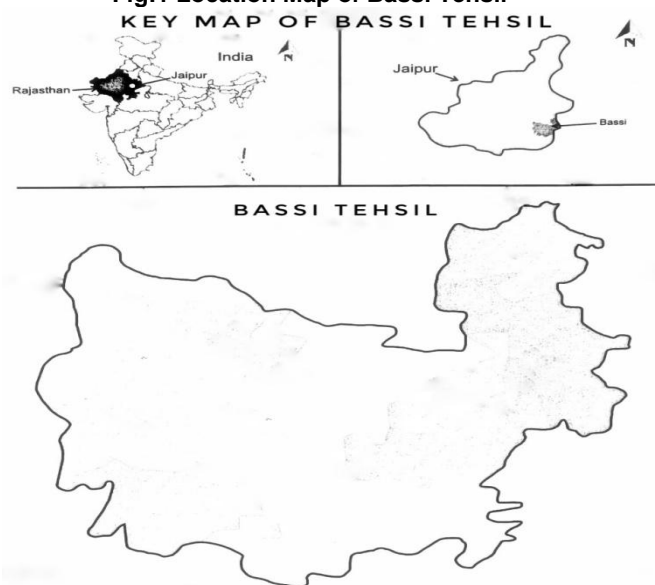
Raw and paved bricks have been used since ancient times for housing construction in India. The manufacturing of clay bricks is counted as a small scale or cottage scale industries in Rajasthan. There are one hundred brick kiln industries operating in Bassi tehsil, though, these industries have contributed significantly in social and economic development in the study area. But there is also the challenge of environ degradation by them, so it is a challenging task to environ friendly development. Proper compliance of environmental rules and regulation or guidelines is necessary for sustainable development. Rajasthan State Pollution Control Board (RSPCB) issued the guidelines under the Air Act, 1981 for establishment and operation for brick kiln industries in the state.

**Keywords:** RSPCB, Abadi, Prominent Place, Guidelines, Areal Distance, Natural Stream.

#### Introduction

Jaipur is the most populated district in the eastern Rajasthan state. District head quarter Jaipur is the largest city and capital of the state. 16 tehsils in this district, Bassi is a major sub district and located in the east direction of the district. Bassi tehsil is situated between 26° 40' to 26° 58' north latitudes and 75° 54' to 76° 13' east longitudes. Total geographical area of the tehsil is 654.69 km<sup>2</sup>. The elevation of the study area is mainly plains, in between, the Aravalli hills are located somewhere and 'Dund' is a small river, which flows in the east part, drains from south part. The Meena schedule tribe principally resides in this region. Land is the major major resource of this area. Apart from this, agriculture and related activities are mainly here for economic development. Due to the development plans of the government, local bodies, organizations etc, small industries have developed. The brick kiln industry has been established the study area for the last 40 years due to the availability of the market from close distance to a large city Jaipur and the availability of clay to make green bricks locally as raw material.

**Fig:1 Location Map of Bassi Tehsil**



## Review of Literature

Awan (1998) pointed out that the brick kilns generally situate at isolated place. Kaur (2002) indicated that the environ pollution is detrimental impact of vicinity area of brick kiln site in Jaipur district. Yadav (2003) studied by using remote sensing techniques in New Delhi and concluded that the Bore wells which are constructed for the water supply to green brick making, the resulting effect is lowering down ground water table. Iqbal (2006) concluded in his research paper that BKs industries contributed air pollution. Joshi (2008) wrote in his research paper that people living near brick kiln sites are more likely to suffer from illness related respiratory system cause by kiln than living far from them. According Khan et al (2008) these industries make negative impact on soil, air, vegetations and human health. Kim et al (2004) highlights the adverse impact on agricultural crops in Vietnam. Fatima (2011) concentered the impact on surrounding vegetations. She analyzed that concentration of SO<sub>2</sub>, NO<sub>2</sub>, SPM at close the vicinity are of kiln site was found to be aboe the permissible level during the operation of kiln.

After review of above literature is necessary to find out the implementation gape of environment policies.

## Objectives of The Study

The aims of this study to investigate the compliance status in implementation of environ policies/acts.

## Data Base and Methodology

The unit of this study was Gram Panchayat. Sample sites were selected by stratification than random sampling. Primary data was collected by field visit of 16 sample sites, personal interviews of industry owner, local people etc. Source of secondary data were SDO office Bassi, Mining Engineer office Jaipur, RSPCB website, Patwar bhawan Google maps etc and consultation of relevant books and literatures.

There are a total of 44 gram panchayats in Bassi tehsil. Out of which only 16 gram panchayats have brick kilns installed, the remaining 28 gram panchayats do not have any brick kilns. Recently there are five newly formed gram panchayats are Mundali, Himmatpura, Vijaypura, Bagrana and Sumel.

**Table No.1**  
**Gram Panchayat Level Spread of Brick Kiln in Bassi Tehsil**

S.No.	Name of Gram Panchayat	BK units in 2008-09	BK units in 2013-14	BK units in 2018-19
1	Benada	2	4	2
2	Bassi	1	0	0
3	Bhateri	1	2	2
4	Burthal	9	8	6
5	Hansmahal	0	3	2
6	Jatwara	0	2	2
7	Jeetawala	13	14	15
8	Kanota	25	18	14
9	Kashipura	0	1	0
10	Khijuriya Brahaman	3	4	2
11	Madhogarh	0	1	0
12	Mansar Kheri	2	3	2
13	Patan	0	2	0
14	Falyawas	3	7	1
15	<b>Ramratanpura</b>	<b>45</b>	<b>42</b>	<b>42</b>
16	Ramsar Palawala	0	2	1
	<b>Total</b>	<b>104</b>	<b>113</b>	<b>91</b>

Source: Mining Engineer office Jaipur

**Table No.2**  
**Field Study of Selected Brick Kiln Sites**

Brick Kiln ID	Location of BK Site	Type of BK	Production of Brunt Bricks /year in lacks	^Total Land Area of BK in M <sup>2</sup>	Reason of The Establishment :- Availability of
01	Kanota	L-BTK	60	3000	Raw Material,
02	Kanota	L-BTK	65	3000	Raw Material, Market Proximity, Transport facility, Fire fuel
03	Kanota	M-BTK	45	3000	Raw Material, Market Proximity
04	Kanota	L-BTK	50	3000	Raw Material, Market Proximity, Transport facility
05	Kanota	L-BTK	50	3000	Raw Material, Transport facility
06	Ramratanpura	M-BTK	50	1500	Raw Material, Market Proximity
07	Ramratanpura	M-BTK	40	1500	Raw Material, Market Proximity, Transport facility
08	Ramratanpura	S-BTK	50	1500	Raw Material,
09	Ramratanpura	L-BTK	30	1500	Raw Material,

10	Ramratanpura	M-BTK	60	1500	Raw Material,
11	Heerawala	L-BTK	50	1500	Raw Material,
12	Heerawala	L-BTK	60	1500	Raw Material, Market Proximity
13	Balyawala	L-BTK	70	1500	Raw Material, Market Proximity
14	Jeetawala	M-BTK	50	4000	Raw Material, Market Proximity
15	Ghata	M-BTK	35	2000	Raw Material, Market Proximity
16	Bhateri	S-BTK	35	9900	Raw Material, Market Proximity, Fire fuel
	Results	L-BTK, 8 Units=50% M-BTK, 6 Units=37.5% S-BTK, 2 Units=12.5%	Average=49.69	Average=2681. 25	

Source: Primary data by survey and ^secondary data from SDO office BASSI

\*NH=National Highway's Boundary

\*\*Other Road boundary

#Rajasthan State Pollution Control Board

@Aerial Distance

@@Central Ground Water Authority

**Table no.3**  
**Field Study of Selected Brick Kiln Sites**

Type of Brick Kiln Site	No. of Sites were Visited	Percentage
L-BTK	8	50
M-BTK	6	37.5
S-BTK	2	12.5

**Table No. 4**  
**Field Study of Selected Brick Kiln Sites: Follow Up of Guidelines**

Brick Kiln ID	^Permi ssion from mining Yes/No	^NOC from RSPCB # Yes/No	AD@ from Abadi (M)	AD@ from NH-B*/O R-B** (M)	AD@ from Other BK(M)	Public Place in Minimu m Radial Distance	Water body in Minimu m Radial Distan ce	Water flows toward the water body is getting obstructe d by BK site	33% Green Covere d Area Covere d by Plantati on	NOC from CGWA @@	Stack Height Accord ing rules	Approach road availabilit y	Sign board availa bility
01	Yes	Yes	1000	600*	700	Yes	No	No	No	No	Yes	Yes	Yes
02	Yes	Yes	1000	800*	250	No	No	No	No	No	Yes	Yes	Yes
03	Yes	No	200	0**	150	No	No	No	No	No	Yes	Yes	Yes
04	Yes	Yes	1500	225*	10	Yes	Yes	No	Yes	No	Yes	Yes	Yes
05	Yes	Yes	1500	30*	200	No	Yes	Yes	No	No	Yes	Yes	No
06	Yes	No	1000	2000**	10	Yes	No	No	No	No	Yes	Yes	No
07	Yes	Yes	1000	200*	250	Yes	Yes	No	No	No	Yes	No	Yes
08	Yes	No	1000	2000*	400	No	Yes	Yes	Yes	No	Yes	Yes	No
09	Yes	No	1000	100**	10	No	No	No	No	No	Yes	Yes	Yes
10	Yes	No	1000	1000**	10	No	Yes	Yes	No	No	Yes	Yes	No
11	Yes	Yes	1000	250**	20	Yes	Yes	Yes	No	No	Yes	Yes	No
12	Yes	Yes	1000	20**	100	No	No	No	No	No	Yes	Yes	Yes
13	Yes	No	200	400**	225	No	No	No	No	No	Yes	Yes	Yes
14	Yes	No	200	200**	300	No	No	No	No	No	Yes	No	No
15	No	No	500	2200*	300	No	No	No	No	No	Yes	Yes	No
16	No	No	1090	1000**	3000	No	Yes	No	No	No	Yes	No	No

Source: Primary data by survey and ^secondary data from SDO office BASSI

Table no. 5 Analyze the data by assigning a weighting to each rule

Brick Kiln ID	Permission from mining Yes/No	NOC from RSPCB B# Yes/No	AD@ from Abadi (M)	AD@ from NH-B*/O R-B** (M)	AD@ from Other BK(M)	Public Place in Minimum Radial Distance	Water body in Minimum Radial Distance	Water flows toward the water body is getting obstructed by BK site	33% Green Covered Area Covered by Plantation	NOC from CGWA @@	Stack Height According rules	Approach road availability	Sign board availability	Total marks out of 13
01	1	1	0	1*	0	0	1	1	0	0	1	1	1	8
02	1	1	0	1*	0	1	1	1	0	0	1	1	1	9
03	1	0	0	0**	0	1	1	1	0	0	1	1	1	7
04	1	1	1	1*	0	0	0	1	1	0	1	1	1	9
05	1	1	1	0*	0	1	0	0	0	0	1	1	0	6
06	1	0	0	1**	0	0	1	1	0	0	1	1	0	6
07	1	1	0	1*	0	0	0	1	0	0	1	0	1	6
08	1	0	0	1*	0	1	0	0	1	0	1	1	0	6
09	1	0	0	1**	0	1	1	1	0	0	1	1	1	8
10	1	0	0	1**	0	1	0	0	0	0	1	1	0	5
11	1	1	0	1**	0	0	0	0	0	0	1	1	0	5
12	1	1	0	0**	0	1	1	1	0	0	1	1	1	8
13	1	0	0	1**	0	1	1	1	0	0	1	1	1	8
14	1	0	0	1**	0	1	1	1	0	0	1	0	0	6
15	0	0	0	1*	0	1	1	1	0	0	1	1	0	6
16	0	0	0	1**	1	1	0	1	0	0	1	0	0	5
N=16	14	7	2	13	1	11	9	12	2	0	16	13	8	ΣX=108

\*NH=National Highway's Boundary

\*\*Other Road boundary

#Rajasthan State Pollution Control Board

@Aerial Distance

@@Central Ground Water Authority

#### Data Analysis and Out Comes

- It is clear from table number 3.3 that out of the total 16 sites studied; only 14 sites have taken legal permission from the Department of Mining. And there were 2 BK sites which are mining the soil, without the legal permission of the Department of Mining. Thus the number of brick kilns for legal mining was 87.5% and the number of illegal miner's sites was 12.5%.
- There are 7 Brick kilns were operating out of 16 in total with NOC from RSPCB. Whose total was 42.75% and the number of BK's operating without the NOC from RSPCB was 9. Their total percentage share was 56.25%.

According to the guidelines of Rajasthan state Pollution Control Board, any brick kiln should be at least 1500 meter aerial distance away from the *Abadi* (Revenue village boundary). Whereas only 12.5% of sample sites were installed at a minimum 1500 meter aerial distance.

- According to the guidelines of Rajasthan state Pollution Control Board, any brick kiln should be at least 100 meter aerial distance away from the national highway and 50 meters from other road. There were 81.25 % sample BK's sites following this rule.
- According to the guidelines of Rajasthan state Pollution Control Board, any brick kiln should be at least 500 meter aerial distance away from any prominent public place (worship places,

Hospitals, community parks etc.). There were 68.75 % sample BK's sites following this rule.

- As per the rules, any brick kiln should be at a minimum aerial distance of 1500 meters from any other brick kiln. During the sample study, it was observed that there were only 6.25% brick kilns that were to be executing with this rule.
- According to the rules of Pollution Board, there should not be any water body like; natural stream, river, nallah, pond and drain, in 1500 meters areal distance from vicinity area of any brick kiln. But at the time of field study, it has been observed that only 56.25% of the sample sites are following this rule.
- An in-depth study of the brick kilns of Bassi Tehsil observed that 25% of the total sample sites are obstructing the flow area of any natural water body.
- Only 12.50% kilns of the total brick kiln's vicinity area were 33% area plantation. Whereas, according to RSPCB's rules, around every brick kiln should compulsorily be planted on 33% area to control the pollution.
- As per the rules, any brick kiln should be a sign board with necessary details (name, complete address, capacity, validity etc.) of BK's industry .It has been seen that 50% sites following this rule.

16 sites were selected by stratification then random sampling for a case study of Bassi tehsil.13 rules were kept in mind for each site according

RSPCB's guidelines, thus assigning a score weight of one point to each rule, the mean value of points of all rules is 6.75, whose total value is 51.92%. Thus we see that only 51.92% issues are implemented of environmental policies or acts by the brick kilns installed in Bassi tehsil. It means that more than 50% brick kiln industries are illegal in Bassi tehsil. There is a big gap in implementation of environmental policies or acts.

#### Impact on workers

Disorganized layout of the workplace leading to poor use of ladders, hazardous pathways, and inadequate or damaged equipment are a few of the physiological hazards currently present in the kilns

Another area of concern involves ergonomic hazards. Women and children in the kilns, who are worked in excess of 10 hours per day, transporting 50lbs or more of bricks repetitively, are especially at risk of developing these chronic physiological disorders. Many female workers are required to transport the green brick as well as the fired brick by hand Environment concern in terms of deterioration of soil as the brick kiln industries utilize essential nutrients in the soil such as nitrogen, phosphorus and potassium hence top soil becomes vulnerable. Moreover Brick dust particles contain known irritants and carcinogens that deteriorate the breathing capacity of the lungs. One of the carcinogenic chemicals contained in brick dust is crystalline silica. Silica is a baseline component of granite rock, sand, soil, and several other minerals.

#### Conclusion

The brick kiln industries are frequently posing many hazards like physiological, occupational, environmental etc. The greatest areas of concern and necessity of control include poor quality fuel used in the kilns, outdated brick kiln technology, use of illegal kilns in the Valley, long hours on the job leading to greater risk of high-level exposure to hazards, infrequent job rotations and ergonomic concerns and minimal personal protective equipment and education.

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