

BURNING BRICKS, SHAPING CONSEQUENCES: AN EMPIRICAL ANALYSIS OF THE ENVIRONMENTAL AND AGRICULTURAL IMPACT OF BRICK-KILN INDUSTRIES IN BUDGAM, DISTRICT IN JAMMU AND KASHMIR UT

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ABSTRACT

This study investigates the profound environmental and agricultural consequences of Brick-kiln industries situated within a 1-km radius of the Panzan, Guda-Sathu and Sunar-Gund villages under the Block Chadoora of District Budgam. Utilizing a qualitative research method, the analysis aims to provide a comprehensive understanding of the adverse effects of Brick-kilns on the local ecosystem. The research, supported by both primary and secondary data, reveals the establishment of more than 10 Brick-Kiln industries surrounds these villages, meeting the demands of nearby towns and villages but at the expense of public well-being and crop sustainability. The study uncovers direct and indirect threats to various environmental elements in the immediate vicinity, with a particular focus on severe and hazardous impacts on arable land, agricultural crops, plants, and trees. The extraction of topsoil from nearby agricultural land for brick production is observed, contributing to reduced productivity and soil degradation, thereby violating environmental laws. Additionally, the emission of black smoke and poisonous gaseous substances by Brick-kiln industry intensifies air pollution, causing significant harm to agricultural crops, plants, and overall public health. The study concludes with a set of recommendations aimed at mitigating the hazardous impacts caused by Brick-kiln industries, emphasizing the urgent need for public awareness campaigns, stricter enforcement of environmental regulations, and sustainable practices within the brick-kiln industry..

Keywords: Brick-Kiln Industries, Environment, Agricultural Land, Pollution, Health.

Introduction

India as a developing nation, has witnessed a two-fold increase in its population over the 35-year period spanning from 1951 to 1986. This substantial demographic surge has created a demand for essential infrastructure, including housing, roads, and civic amenities, to align with modern lifestyles. The pivotal drivers of infrastructural development in urban areas, cities, and villages are urbanization, industrialization, and improvements in the standard of living.

Presently, the primary element shaping India's infrastructural landscape is the ubiquitous "brick," as opposed to stone, which is less frequently utilized. Most residences, buildings, and other structures are predominantly constructed with bricks. Despite its crucial role as a building material, bricks are formally recognized as a small-scale industry falling under the MSME sector (DCMSME, 2008). With approximately 100,000 operational kilns, brick making contributes about 0.7 percent to the country's gross domestic product and provides employment for approximately 10 million individuals (Gupta and Narayan, 2010; Lalchandani et al., 2012).

India heavily relies on bricks for construction, driven by the large population size and the durability of fired bricks. The construction industry in the country boasts a turnover of around 157 billion USD, and it is anticipated to grow at a rate of 8-10% annually over the next decade (AICCTU, 2022). To accommodate the escalating urban population, India needs to annually construct 700–900 million square meters of residential and commercial space (Deccan Herald, 2023). The rapid urbanization has given rise to a flourishing construction industry, producing 233 billion bricks each year, with demand rising at an annual rate of approximately 6.6 percent (Eil et al., 2020). However, the Brick-Kiln Industries, crucial to this growth, are either directly or indirectly reliant on nearby agricultural land due to the availability of suitable soil for brick making. This dependence has resulted in adverse effects on the environmental components constituting the local ecosystem. In Jammu and Kashmir, numerous sources of air pollution, including an upsurge in the number of vehicles, particularly diesel-run ones, emissions from brick kilns, cement plants, and dusty roads, contribute significantly to escalating air pollution levels (Greater Kashmir, 2023). Consequently, this

research aims to investigate the specific nature of the impact of Brick-Kiln Industries on the environment and agriculture in the study area.

Context of the Study

Fired clay bricks stand as a cornerstone in the construction landscape of India, holding immense significance as one of the primary building materials. India proudly ranks as the second-largest producer of bricks globally, contributing to over 10% of the world's production. The nation hosts an extensive network of brick kilns, with an estimated 100,000 in operation, collectively churning out approximately 250 billion bricks each year.

In Jammu and Kashmir, Budgam started to become known as a major brick-making hub some 60 years ago. Brick kilns were mostly found in the River Jhelum region, encompassing towns like Lasjan, Sumberbug, Shalina, and Tengan, until the late 1960s. More than two dozen brick kilns met the building demands of small towns and cities that were headed for economic growth by receiving their raw materials from local karewas (plateaus).

Bricks were produced locally in rural Kashmir using improvised kilns known as koondieh; in certain isolated parts of southern Kashmir, this age-old technique is still in use. There was a notable building boom in the years that followed, especially in Srinagar city, as new economic possibilities were available to the people of Kashmir. The kilns in the Lasjan region had to run nonstop to keep up with the unexpected demand for bricks.

But people began migrating farther into Budgam, where the karewas were not as highly appreciated as in Pampore, because of the restricted raw material supply in the Lasjan region and the reluctance to use saffron soil as it is now. For the residents, this change brought both advantages and disadvantages. Budgam saw the spread of brick kilns, which turned once-beautiful villages into dismal, soggy places.

By the mid-1970s, hundreds of large chimneys had become a permanent feature of Budgam's once beautiful landscape. The increasing demand for bricks led farmers to uproot apple, pear, and almond orchards to make way for the brick manufacturing industry.

In a study published in the *Journal of Pollution Effects and Control* (2014), it was revealed that all brick kilns in Budgam are of the old Bull Trench kiln type and have a substantial appetite for coal. Each of these kilns consumes an average of 3 tonnes of coal during a season spanning just six months. The operational phase of these kilns fills the air in Budgam with dust, sulfur dioxide, and nitrogen dioxide, all of which are harmful to both humans and the environment.

Panzan village in Budgam faces a looming environmental crisis. In an area of just one square kilometers, there are about 10 brick kilns all emitting black smoke filled with sulfur dioxide and nitrogen dioxide into the atmosphere. The air quality becomes extremely poor when all the brick kilns are operational, causing concerns, particularly for new-borns and school-going children.

The rapid conversion of fertile fields into brick kilns, or leasing land for soil extraction for brick-making, affected Bugam village in the early 1980s, much like other parts of Budgam. By that time, nearly 80 percent of fertile land in Budgam was leased to influential brick kiln owners. Besides establishing over twenty brick kilns in around the Panzan in Budgam, they also used adjacent fields to extract fertile soil for brick production. This phenomenon involved both local and external stakeholders (Kashmir Life, 2019).

Objective of the study

The brick industry in India serves as a vital contributor to infrastructural development, offering employment opportunities, particularly for economically disadvantaged sections of society, and playing a crucial role in driving economic growth. However, the brick industry has raised environmental concerns at a national level.

Presently, India boasts more than 100,000 brick kilns, with a substantial concentration in all regions of the country. In the study area of Panzan, Guda-Sathu and Sunar-Gund located in the Budgam district of Jammu and Kashmir, there are more than 10 brick kiln industries established closely within a radius of 1-km. These brick kilns consistently deplete the topsoil cover of adjacent agricultural lands within a range of 3-5 km. The industry also

relies on natural resources such as plants, trees, and coal.

Despite its contributions, the brick industry poses significant environmental challenges. The burning of plants, trees, and large quantities of low-quality coal by brick kilns results in air pollution, jeopardizing the local ecosystem. Residents living in proximity to brick kilns face issues such as land degradation, reduced agricultural productivity, deforestation, and exposure to air pollution, including the emission of black smoke and harmful gases.

Considering the hazardous impact of brick kilns on the habitat and living environment of natural flora and fauna, this research aims to uncover the problems and impacts caused by brick kilns on the local environment and agriculture. During the dry season, brick kilns operate at full capacity, emitting black smoke, creating noise, and generating heat. The present study seeks to analyse the environmental impact resulting from the location of brick kilns within 1 km in 3 villages: Panzan, Guda-Sathu, and Sunar-Gund of Block Chadoora of District Budgam in Jammu and Kashmir.

The key finding of this research is that brick kilns not only produce building materials but also contribute to environmental pollution and land degradation in the study area. The study outlines specific objectives to provide a comprehensive understanding of the situation. Firstly, it aims to identify the impact of brick kilns on agricultural land and crops. Secondly, it explores the relationship between the local environment and brick kilns. Lastly, the study investigates the effects of brick kilns on the health of people living in close proximity to the study area.

Theoretical Relevance

To investigate the environmental impact of Brick-kiln industries, various theoretical frameworks have been considered. Cotton and Dunlop (1978) highlighted the New Environmental Paradigm (NEP), emphasizing the interaction between the physical environment and social organization. However, Hannigan (1995) critiqued the NEP for broadening its scope beyond the core, including built environment, natural disaster, and social impact assessment.

According to Cotton and Dunlop, environmental scientists favour a non-anthropocentric viewpoint in response to continuous environmental issues. The NEP's core tenets include recognizing the consequential impact of human interventions on the environment and acknowledging the conflict between environmental protection and unlimited human needs due to Earth's limited resources (Nasreen, 1998).

Brickfields, as both an industry and a human intervention, aligns with the NEP's focus on understanding the impact of purposive human activities on the environment. The Marxist environmental theory, rooted in the writings of Marx and Engels, views the environment as crucial for human existence but emphasizes human development over environmental preservation.

In the context of Brick-kiln industry, two social classes emerge: the owners and government authorities versus ordinary people living nearby. The Marxist perspective places blame on advanced industrial capitalism for environmental destruction, framing environmental issues as social class conflicts. The nexus between Brick-kiln owners and government officials leads to industrial exploitation, including soil removal, indiscriminate burning, and air pollution.

Contemporary Marxist theory expands on the role of the state, depicting politicians and bureaucrats as committed to supporting capitalist interests. Allan Schnaiberg's "Treadmill of Production" concept outlines the tension between economic expansion and environmental disruption. The clash between "use values" (preservation of natural resources) and "exchange values" (industrial use) is evident in the impact of Brick-kilns.

Schnaiberg's analysis suggests that as environmental protection gains importance, the state must balance its role as a facilitator of economic growth with its responsibility as an environmental regulator. This dynamic is reflected in Brick-kilns-related environmental acts and policies, which, despite aiming for protection, may be exploited by capitalist forces, reinforcing the state's commitment to economic growth at the expense of the environment.

Methodology

The proposed research deals with a number of interrelated issues, including land degradation, context of soil selling, agricultural damage, effect of air pollution on health and environment from socio-environmental point of view. This study is based on both primary and secondary data. Among primary data, the opinion of farmers, local people, have been obtained through structured interview schedule. The study largely depends on the qualitative method because the nature of the study require exploratory and descriptive methods. The study has been conducted in the Panzan brick-kiln Industrial cluster of District Budgam, within 1-km of the study area, more than 10 Brick-Kiln industries have been established. Villagers of the study area are very much concerned about the multifaceted impact of Brick-killn industries. In order to conduct this piece of research, the researcher has selected 3-villages through random sampling method out of total 10-villages. The study population consists of village farmers affected by the Brick-kiln industrial area besides The researcher has taken a sample of 20 farmers out of the total 3500 farmers through simple random sampling to get a representative sample.

Findings and Discussion

This exploratory research work specifically revealed the impact and effects of Brick-kiln industries on the local air condition, plants, trees, and health of the nearby agricultural land and crops. According to the Jammu and Kashmir Brick Kilns (Regulation) Act, 2010, it is mandatory for the owner to obtain permission from the Industries and Commerce Department to establish a brick kiln. After submitting the proposal for establishing a brick kiln, a non-objection certificate is required from the concerned deputy commissioner, state pollution control board, divisional forest officer, wildlife warden, director geology and mining, district agricultural officer, district medical officer, tehsil educational officer, the executive engineer R&B (PWD) concerned, and the concerned tehsildar. No brick kiln shall be established on any land fit for cultivation, declared Banjri-Qadeem as per the revenue record, or within the demarcated forest area of

the state under the Jammu and Kashmir Forest Act 1987.

However, upon visiting the study site, the researcher identified gross violations of the Brick Kilns Amendment Act 2010. In the study area, more than 10 brick kilns have been established within a 1-km radius surrounded by a densely populated locality. Another sampled brick kiln has also been established within half a kilometer from the locality. This constitutes a major violation of environmental laws, and the researcher has realized that the licenses for establishing brick kilns were in violation of the Brick Kilns Act, 2010. The reality is that Brick-kilns indulge in the indiscriminate burning of plants and trees for the brick kilns, as it is cheaper than coal. According to Brick-kiln industry managers, brick kilns burn about 200 Quintels of firewood per year and later burn coal, in gross violation of the environmental standards.

The study also reveals the economic hardships of farmers as the underlying reason compelling them to sell the topsoil of their agricultural land. Besides brick-kiln owners lure farmers by offering a higher price for the topsoil or force them to sell the topsoil under social pressure. From field observations, the researcher found that farmers faced fewer losses of damaged crops due to the brick kiln chimneys, which were not made of steel sheet and not above the recommended height (115 ft) as per the state pollution control board. However, the scenario in the case of land degradation and damage is very dangerous. The topsoil of most agricultural land near the brick kilns was removed for brick making. Moreover, the actual scenario shows gross violations of the said Act. If this topsoil collection continues unabated year after year, almost all of the agricultural land will render the land unfit for agriculture.

Farmers should implement a range of actions and strategies to rejuvenate and enhance the fertility of their land.

The following measures should be taken by farmers in order to restore the land fertility that is damaged by Brick-kiln Industries;

- Crop Rotation: Implement a systematic crop rotation plan to break pest cycles, enhance soil structure, and replenish soil nutrients naturally.

- Green Manure Cover Crops: Cultivate green manure cover crops such as legumes and clover to improve soil fertility by fixing nitrogen and adding organic matter.
- Application of Organic Mulch: Use organic mulch like straw or leaves to cover the soil surface, preventing erosion, retaining moisture, and enriching the soil as it decomposes.
- Integrate Agroforestry Practices: Integrate trees and shrubs into farming systems to improve biodiversity, prevent soil erosion, and enhance nutrient cycling.
- Conservation Tillage: Adopt conservation tillage practices to reduce soil disturbance, enhance water retention, and promote the preservation of soil structure.
- Utilize Biochar: Consider incorporating biochar into the soil, a charcoal-like substance produced from organic matter, to improve soil structure and nutrient retention.
- Promote Vermicomposting: Set up vermicomposting units to produce nutrient-rich compost using earthworms, contributing to soil health and fertility.

Air Pollution and Deforestation due to Brick-kiln Industries

Severe air pollution has been identified in the study area during the active operations of the Brick-kilns, particularly from May to September. The vicinity surrounding the Brick-kiln is shrouded in black smoke, emitting a noxious odour from the combustion of coal. The detrimental impact of this significant air pollution has led to various health issues among the residents living near the Brick-kilns, including skin diseases, bronchitis, throat infections, coughing, shortness of breath, headaches, and eye irritation.

Furthermore, the study highlights the alarming deforestation occurring in the Brick-kilns, where a substantial number of plants and trees are indiscriminately burned. This practice is prevalent due to the local availability and cost-effectiveness of wood compared to coal. Each Brick-kiln, during its burning phase, consumes approximately 10-20 tons of firewood. The unchecked burning of plants and trees poses a serious threat to the biodiversity habitat of the locality.

Effects of Brick-kin industries on the Residents

During the dry season, from May to September, when Brick-kilns are in full operation, they emit significant amounts of black smoke, coal particles, and dust in the surrounding areas, negatively impacting the health of local residents. The regulations set by the Jammu and Kashmir State Pollution Control Board prohibit the establishment of Brick-kilns within 500 meters of any locality, yet in the study area, more than 10 brick kilns operate in close proximity to residential areas. These kilns emit dense black smoke containing harmful chemicals such as sulphur-dioxide, carbon-dioxide, and carbon-monoxide, along with dust particles and coal grinds, posing serious health risks to the residents. Furthermore, the study reveals that Brick-Kilns in the area burn old motor tires and furnace oil, further contributing to the environmental degradation.

The adverse effects on the fragile environment have manifested in reported cases of health issues among the local population, including headaches, vomiting, skin itching, and respiratory problems.

Suggestions

Environmental degradation resulting from brick-kilns, such as air pollution, deforestation, and damage to agricultural land, can be addressed through the following recommendations:

- Implement stringent measures to prevent the violation of Brick-kilns related regulations and curb corruption within offices responsible for granting brick-kiln industry licenses.
- Cease the burning of plants and trees in brick kilns, and enforce strict penalties, including imprisonment and fines, for those violating the Brick Burning Act.
- Restrict the use of topsoil from fertile agricultural areas in brick production to preserve the productivity of high-quality agricultural land. Focus on utilizing soil from barren highlands for brick manufacturing.
- Mandate the construction of brick-kiln chimneys with concrete, ensuring a

minimum height of 115 ft to facilitate effective dispersion of emissions.

- Establish active monitoring by environmental officials to oversee the establishment and operations of brick-kilns, ensuring compliance with environmental regulations and standards.

Conclusion

This research endeavour engages in an interpretative and exploratory examination of how Brick-kilns impact the nearby environment, agriculture, and the residents of the surrounding area. The study brings to light the significant adverse effects and challenges stemming from Brick-kilns on the local environment and agricultural endeavours. Particularly noteworthy are the detrimental impacts on agricultural land, especially when top-soil is extracted for brick production. The research also underscores the severe air

pollution and widespread burning of plants and trees within Brick kilns, posing a considerable threat to the environment.

While recognizing that Brick-kilns contribute to local employment, fostering national economic and infrastructural development, the study underscores the necessity of weighing these benefits against the associated costs. It stresses the importance of strict adherence to existing laws and regulations by Brick-kilns to mitigate their environmental footprint. In light of these revelations, the research recommends the implementation of measures to curb the unlawful operation of Brick kilns. Robust enforcement of regulations and proactive measures to address environmental concerns are imperative for fostering sustainable and responsible practices within the Brick-kiln industry.

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