



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

International Journal of Recent Scientific Research
Vol. 6, Issue, 2, pp.2830-2832, February, 2015

**International Journal
of Recent Scientific
Research**

RESEARCH ARTICLE

MODERN BRICKKILN INDUSTRIES AND EMERGING MAN MADE HAZARDS IN VINNAMANGALAM VILLAGE IN THIRUVAIYARU TALUK USING SPATIAL INFORMATION TECHNOLOGY

Thirumalai. P*, Anand. P.H, Sudha. D, Chitra. K, Priya. P and Manivel. P

Department of Geography, Government Arts College (A), Kumbakonam, TamilNadu, India

ARTICLE INFO

Article History:

Received 2nd, January, 2015
Received in revised form 10th,
January, 2015
Accepted 4th, February, 2015
Published online 28th,
February, 2015

Key words:

Brick kilns, Chamber,
Ceramic product, Shale.

ABSTRACT

Brickkiln is a household as well as modern industry emerges a great environmental concern in Thanjavur district. People who are living along the river side uses the bund clay to manufacture brickkiln with the available resources, such as sand water and wood to heat up process in the chambers. River encroachments have been increasing with the brickline chambers and the bund size is reducing due to the extraction of lays without looking at the future environmental problems. News paper Reports indicate the few villages, such as the present study area, Vinnamangalam which is located at the Tiruvaiyaru Taluk designate increasing number of modern brickline industries apart from the household chambers. The modern industries require enormous quantity of brick clays and surface and subsurface water to manufacture bricks at large scale. This needs a detailed study about the misuse of land to set up modern brickline industries and their implications in the sample village of Vinnamangalam and the present study is a sample study to show how a village has been under sever environmental destruction due to the setting up of modern brickline industries and how the natural resources are being used by the brickkiln industries without giving access to common man.

Copyright © 2015 Thirumalai. P, *et al.* This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Bricks remain one of the most important building materials in the country. Brick making is a traditional industry in India, generally confined to rural areas. Notably, the Indian brick industry, with more than 1 lakh production units producing about 100 billion bricks annually, is the second largest brick producer in the world after that of China. The industry has an annual turnover of more than Rs. 10,000 crores and, very importantly, it is one of the largest employment generating industries, employing millions of workers. However, brick making is an energy intensive process as fuel costs account for almost 30% of the production cost. Despite all initiatives to introduce alternative walling materials like compressed earth blocks, concrete / stone crete blocks, and fly ash bricks, it is envisaged that burnt clay bricks would still occupy the dominant position in the foreseeable decades.

The conventional practice of firing clay bricks in Bull's Trench Kilns (BTK) and rural country clamps consumes huge quantities of energy in terms of coal, firewood and other fuels. They are also notorious as highly polluting establishments, affecting not just the flora and fauna, but also posing severe threats to human health. The pollution by these units has attracted considerable attention and strict action by the environmental authorities. The brick industry, in effect, has been advised to improve upon the traditional technology or go in for completely new technologies. The fundamentals of brick

manufacturing have not changed over time. However, technological advancements have made contemporary brick plants substantially more efficient and have improved the overall quality of the products. A more complete knowledge of raw materials and their properties, better control of firing, improved kiln designs and more advanced mechanization have all contributed to advancing the brick industry. Other technical notes in this series address the classification and selection of brick considering the use, exposure and required durability of the finished brickwork.

Brick is made of clay or shale formed, dried and fired into a durable ceramic product. There are three ways to form the shape and size of a brick: extruded (stiff mud), molded (soft mud) and dry pressed. The majority of brick are made by the extrusion method. Brick achieves its color through the minerals in the fired clay or through coatings that are applied before or after the firing process. This provides a durable color that never fades or diminishes. Brick shrink during the manufacturing process as nitrifications occurs. Brick will vary in size due to the manufacturing process. These variations are addressed by ASTM standards. The method used to form a brick has a major impact on its texture. Sand-finished surfaces are typical with molded brick. A variety of textures can be achieved with extruded brick. Brick manufacturers address sustainability by locating manufacturing facilities near clay sources to reduce transportation, by recycling of process waste, by reclaiming land where mining has occurred, and by taking measures to

*Corresponding author: **Thirumalai. P**

Department of Geography, Government Arts College (A), Kumbakonam, TamilNadu, India

reduce plant emissions. Most brick are used within 500 miles of a brick manufacturing facility Clay is one of the most abundant natural mineral materials on earth. For brick manufacturing, clay must possess some specific properties and characteristics. Such clays must have plasticity, which permits them to be shaped or molded when mixed with water; they must have sufficient wet and air-dried strength to maintain their shape after forming. Also, when subjected to appropriate temperatures, the clay particles must fuse together.

The manufacturer minimizes variations in chemical composition and physical properties by mixing clays from different sources and different locations in the pit. Clays occur in three principal forms, all of which have similar chemical compositions but different physical characteristics. Surface clays may be the up thrusts of older deposits or of more recent sedimentary formations. As the name implies, they are found near the surface of the earth. Shale is clays that have been subjected to high pressures until they have nearly hardened into slate. Fire clays are usually mined at deeper levels than other clays and have refractory qualities. Surface and fire clays have a different physical structure from shale but are similar in chemical composition. Brick Industry Association Manufacturing of Brick three types of clay are composed of silica and alumina with varying amounts of metallic oxides. Metallic oxides act as fluxes promoting fusion of the particles at lower temperatures. Metallic oxides (particularly those of iron, magnesium and calcium) influence the color of the fired brick. Chemical composition varies within the pit, and the differences are compensated for by varying manufacturing processes. As a result, brick from the same manufacturer will have slightly different properties in subsequent production runs. Further, brick from different manufacturers that have the same appearance may differ in other properties.

Study Area Descriptions

Thiruvaiyaru is a panchayat town in Thanjavur district in the Indian state of Tamil Nadu. It is situated on the banks of the river Kaveri, 13 km from Thanjavur, Thiruvaiyaru has an old Shiva temple dedicated to Panchanatheeswar. Though pilgrims flock to this temple throughout the year, Thiruvaiyaru is more renowned for its association with Saint Thyagaraja, who, along with Muthuswami Dikshitar and Shyama Sastri, comprises the Trinity of Carnatic music. Thiruvaiyaru means Five Rivers around the city. Thiruvaiyaru is located at 10.88° N, 79.1° E. It has an average elevation of 38 metres (124 feet).

Problem statement

Brick kilns being a being a household industry emerges a great environmental concern in Thanjavur district. People who are living along the river side uses the bund clay to manufacture brick kiln with the available resources, such as sand and water and trees to heat up the process in the chambers over exploitation of sand and water to manufacture bricks at large scale. This resulting over exploitation of sand and water reduces the ground water table and the villagers those who are depending ground water resources for the survival is a major question in the modern brickline villages. Apart from this problem, the modern industries as well as local chambers uses unwanted substances for the heating process in the chambers, such as rubber tubes, which poses a major health hazard in this

region. Evidences indicate that there are cases of lung diseases in this village for violating the environmental norms that the unwanted substances must not be used to fire the clays. The destruction of more trees has been witnessed by the villagers in the recent years to use as heating process of bricks. Field investigation reveals that the child laborers are deployed in these industries and violating the government norms.

Objectives

- To study the location of local and modern brick kiln industries and their locational characters using GPS.
- To highlight the environmental implications, both to nature and the human being, in the rural environment and justify even villages are posing for severe environmental threats like the urban.

MATERIALS AND METHODS

To study the rural environmental problem in the selected study area of Vinnamangalam, village map has been obtained from the Taluk headquarters of Thiruvaiyaru. The map was scanned and converted into digital map using ArcGIS 9.0. GPS has been used to take control point for registration and geo referencing. The shape files have been created in Arc catalogue and the maps were designed. The locations of local and modern chambers were located using GPS along with the details in the attached attribute table. The sand mining areas which are being used by the modern and local brick kiln industries have been surveyed using GPS. The location of household and people who are affected by the lung disease has also been gathered in the field and used for digital maps for further discussion.

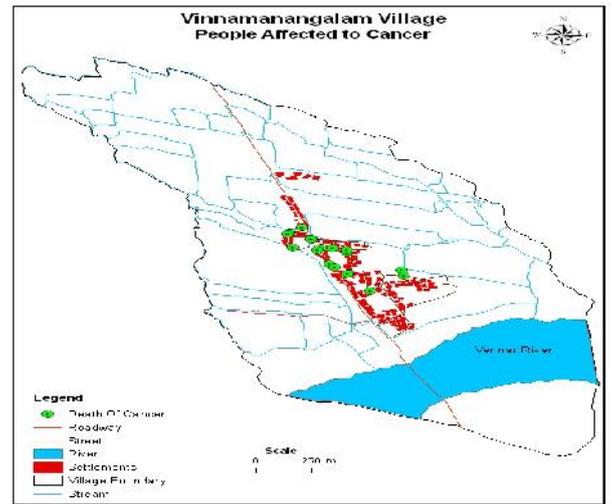
RESULTS AND DISCUSSION

Based on the news paper reports Vinnamangalam village has been selected to study how a village is emerging to face major environmental problem, reduction of surface soil and lowering ground water levels due to over exploitation and degradation of forests due to unauthorized cutting of trees which are required to heat the bricks in the local and modern chambers. **Figure -1** shows the study area of vinnamangalam village with physical and cultural features surrounded by the settlement area. The chamber locations with agricultural land categories and vegetation has been specifically shown in the study area map. GPS field survey conducted in the village to gather information such as the locations of chambers, mining areas, settlements and the points for the registration of control points. **Figure 2** shows the location of modern and traditional chambers of the Vinnamangalam **Figure 3** shows the major health hazards due to the release of unwanted substances in the form of chemical pollutants that would ultimately affect the lungs and 18 people were killed induce cancer to the surrounding population. This is an example study, how a village environment is also deteriorated due to the setting up of modern brick kiln industries in this region.

CONCLUSION

Indiscriminate permission given to brick kilns at Vinnamangalam in Thiruvaiyaru taluk in the district is wreaking havoc on the environment. Located on the northern bank of Vennar, the village was once fertile, with people cultivating paddy, sugarcane, black gram, green gram and maize. Now, the environment is polluted due to the setting up

of brick kilns. Previously, there were only two. But now, four more have come up. The kilns produce 2.5 lakh bricks a day using the soil taken from the river bed and cultivable lands. "Fertile, cultivable lands are plundered by the brick kiln owners. Many farmers have no option other than to sell their land and leave the village," says an elderly villager. The kilns use motors to suck water from the river and the ground. Trees are cut down. Batteries and plastic bakelite wastes are used as fuel to fire the clay bricks. This has resulted in pollution, say the villagers. They allege that several residents have been afflicted with breathing problems, lung diseases etc. "Fertile top soil from the cultivable land is removed by brick kiln owners to make bricks," is the refrain. Yet another problem faced by the villagers is the lack of irrigation facilities. Vinnamangalam canal, the irrigation channel for the village, is eight km. The village is at the tail end of the canal, which is also an irrigation source for Renganathapuram, Pazhamaneri and Dikshasamudram. Vinnamangalam villagers, therefore, want the creation of an additional sluice at Pillaiyaikkal-Velankudi canal head from where Vinnamangalam canal gets water. A separate branch can be formed to take the water straight to the village, they say. Another suggestion is putting a regulator in Korai canal, which runs near Vinnamangalam canal, and supply water to the village. "The Public Works Department should come to our rescue and implement any of the above schemes. Pollution by brick kilns should be stopped by enforcement of pollution control laws lest our village becomes a desert," say the villagers. The brick kilns have not provided employment to locals. Labourers are brought in from other districts. The kilns have also dealt a death blow to conventional brick making. The activity is usually carried out during summer. But the modern kilns have permanent units operating throughout the year. "Both the economy of the local people and the environment is in danger," says a concerned resident.



References

- Annon. CBRI develops eco-friendly technology for brick making. *The Hindu*, Sunday, January 3, 1999.
- Arya, D.S. & S.A. ABBASI (1995), *Urbanization and its environmental impacts*. New Delhi: Discovery.
- Ashford. "Criss in the Workplace: Occupational Diseases and Injury". 1st Edn., MIT Press, Cambridge, pp. 612., 1976
- Barrow, C.J. (1991), *Land degradation, development and breakdown of terrestrial environments*. Cambridge & New York: Cambridge.
- Bentnick, J.V. (1995), *Bricks or crops? Brick kilns and its impact on land degradation in the rural-urban fringe of Delhi*. Groningen: unpublished MA thesis.
- Blaikie, P. and H. Brookfield, eds. (1987), *Land degradation and society*. London: Methuen.
- Brick encyclopedia topic Reference_com.htm40.
- Chandrasekaran, V.A., M. Ramkumar (1991), *Environmental Impact of Limestone Mining near Ariyalur, Tamil Nadu, India*. *The Indian Geographical Journal*, Dec. 1991, pp. 120-127.
- Fellmann, J., A. Getis and J. Getis (1997), *Human Geography, landscapes of human activities*. Madison: Brown & Benchmark. 163.
- Ginsburg, N., B. Koppel and T.G. Mcgee, eds. (1991), *The extended metropolis, settlement transition in Asia*. Honolulu: University of Hawaii Press.
- Kataria, V., S.K. Aggarwal and J.V. Bentnick (1997), *Environmental and health implications of industrialization in an urban village at Delhi's fringe*. Paper for the International Seminar on the Promotion of Environmentally Sound and Healthy Cities.
- Majumderjudul Islam (2009): *A study of brick industry in Barkhola Development Block of Cachar District*.
- Mamoria. C.B. *et al*: (1997) "Dynamics of Industrial Relations." Himalaya Publishing House, Mumbai.
- Nusrath, A. ,P.D. Mahadev (1991), *Environmental impact of brick Loam quarrying on agricultural soil*. *The Indian Geographical Journal*, Dec., pp. 83-88.
- Sivaprakash, P *et al* (2011): *Discussion on Accidents, Hazards and Risk in Industries--A Review* European Journal of Scientific Research, Euro Journals Publishing.

