Short Communication (NS-2)

A STUDY OF LAND DEGRADATION DUE TO BRICK INDUSTRIES IN UJJAIN (INDIA)

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ABSTRACT

Brick industries are unorganized small scale industries which are important for economic development of Ujjain. The life line of Ujjain is river Kshipra which is the source of water for brick industries and the banks of river Kshipra provide good quality of clay for brick production. As a result about 361 brick kilns are clustered around banks of river Kshipra. These brick kilns cause large scale environmental pollution and degradation of land. The present study shows the magnitude of land area degraded due to brick industries in Ujjain and discusses the future challenges for these industries.

Key Words : Brick industries, Clay, land degradation, Nutrient disorders.

INTRODUCTION

Land is an important natural resource which is present on earth in limited amount. The degradation of this natural resource is one of the most serious problems of the world today. Land degradation implies the temporary or permanent decline in the productive capacity of the land. Land degradation occurs due to natural or anthropogenic factors. Soil degradation is recognized as major aspect of land degradation.

In India, bricks are usually made of clay, and are generally produced in traditional, unorganized small scale industries. Bricks are important building material and about 140 billion bricks are annually produced by these industries. Brick industries are essential for economic development as they provide employment to nearly 12 million people. Due to increase in population, demand of houses and infrastructure is increasing, as a result use of bricks is also increasing.

An important step in brick making is firing of bricks in brick kilns (a furnace in which bricks are baked or burnt) which causes serious environmental pollution and health problems. Brick burning largely influence the concentrations of greenhouse gases in the atmosphere. Impact of brick industries on air pollution, vegetation and human health has been studied by many workers who have shown that brick industries cause air pollution and land degradation besides decreasing herb density and causing nutrient disorders in plants/trees in immediate vicinity. It has been reported...
that the workers in brick industries are prone to respiratory diseases such as silicosis, pneumonocosis and musculoskeletal disorders\textsuperscript{8-10}.

Bricks are made of clay to which a large number of additives like fuel wood, soybean husk, fly ash and other agricultural waste are added\textsuperscript{11}. Brick making consumes large amount of clay which leads to top soil removal and land degradation. Large areas of lands are destroyed every year especially in developing countries due to collection of soil from a depth of about 1 to 2 m from agricultural land. A study in Bangladesh shows that about 5000 ha area was degraded during the 1998-99 due to brick industries\textsuperscript{12}. These affected areas are expanding rapidly due to increase in brick production. The top soil nutrient elements and soil biota are also destroyed through brick burning and brick burning also alters the physico-chemical properties of soil\textsuperscript{13}. The present study was undertaken to assess impact of brick making on the degradation of land in Ujjain.

**MATERIAL AND METHODS**

A survey was done in Ujjain to estimate the number and location of brick industries. The numbers of brick kilns present in Ujjain were counted physically and the number was verified with the help of Google earth map.

A questionnaire was prepared and it was filled with the help of workers of brick kilns to learn the process of brick making, the time of brick making and approximate number of bricks produced annually by these kilns.

**Consumption of clay in brick production**

The amount of clay used for making one brick was determined by talking to the workers and was verified by weighing the bricks individually and calculating average weight. The total amount of clay used in brick production annually was calculated by multiplying weight of one brick with total number of bricks produced.

**Estimation of land area degraded due to brick production**

To estimate the land area degraded due to digging of clay for making bricks, three model experimental pits were dug. The dimensions of one pit were 2 x 2 x 1 ft. The amount of soil excavated from each pit was weighed and average value was calculated. The number of possible bricks which could be produced from this soil was calculated. From this, the land area degraded due to one brick produced was calculated. Using this value total land area degraded by total bricks produced in a year was determined. The details are discussed in results.

**RESULTS AND DISCUSSION**

In the present study first attempt was to document the exact number of brick kilns present in Ujjain. To achieve this, the whole city was surveyed and numbers of brick kilns were physically counted. The number of brick kilns was verified by consulting the Google earth map. The results show that there are total 361 brick kilns in Ujjain. Most of these kilns are clustered on one side of river Kshipra. During the survey the questionnaire was filled with the help of workers of brick kilns and information was collected from the workers. The process of brick making in Ujjain is traditional. The main constituent of bricks is clay and a number of additives like fly ash, soybean/wheat husk are added to increase the strength of bricks.

The banks and near by areas of river are source of very good quality of clay. To obtain clay pits of approximately 3m depth are dug in land around the river Kshipra. The excavated clay is then heaped and additives are added. The mixture of clay and additives is mixed thoroughly using river water. The mixture is covered with plastic and left over
night so that plasticity develops in the mixture and then it is filled in the moulds. The moulds filled with mixture are dried in open air. The dried bricks are then fired after which they are cooled and are ready to be used.

The analysis of questionnaire also indicated that the brick kilns operate throughout the year except in rainy season. One brick kiln produces approximately fifteen thousand (15000) bricks in one firing. As these kilns operate thrice a year, so one kiln produces about 45000 bricks in one year. As there are 361 brick kilns, the total brick production in Ujjain is one crore sixty two lakh forty five thousand (16245000) bricks per year.

The amount of clay used in making one brick was estimated by talking to the workers and physically verified by weighing the bricks and calculating the average weight. It was found that for making one brick approximately 3 kg of clay is used. As total number of bricks produced annually in Ujjain is 16245000, therefore, 48735000 kg (16245000 x 3) of clay is consumed annually for brick production in Ujjain.

The model experimental pits were dug to calculate the land area degraded due to brick production. The size of each experimental pit was 2 x 2 x 1 ft (4 sq ft). On an average 140 kg of was excavated from each pit, using which, 47 bricks (140 Kg, total weight of soil / 3 Kg, weight of one brick) could be produced. Thus production of 47 bricks leads to degradation of 4 sq ft land.

For actual brick production digging is done to the depth of 3m (10 ft) in Ujjain. Thus from a pit of 2 x 2 x 10 ft total 470 bricks can be produced, which will lead to degradation of 4 sq ft area in actual terms. In Ujjain 16245000 bricks are produced annually, so the degraded land area is 138255 sq ft per year. This area is equivalent to the area used for making 92 houses of 1500 sq ft. Thus the study shows that brick making in Ujjain is degrading huge land area per year. This is a great loss as agricultural land is being destroyed, which will take thousands of years for renewing. Besides this brick making also causes destruction of top soil nutrients and changes physico-chemical properties of soil due to burning process.

CONCLUSION

The study shows that Brick Industries in Ujjain are degrading huge land area every year but these industries are very important for economy of Ujjain city, as they provide employment opportunities to local people and building material for construction, hence, they cannot be shut down. So, the challenge before these industries is to find alternative for clay or to increase additives in bricks so the consumption of clay can be reduced.

REFERENCES


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SAVE THE ENVIRONMENT

Good environment is good health

Air pollution causes health hazards

Recycle every drop of water