IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

# EIA ANALYSIS OF BRICK INDUSTRY A CASE STUDY OF BRICK INDUSTRIES LOCATED AT BHELEUGURI, MARIANI

UTTAM MILI, M.A., NET
ASSISTANT PROFESSOR, MARIANI COLLEGE

**Abstract:** Brick industry is utmost important in constructional operation. The increasing population has led to the establishments of more numbers of brick industries. Brick industry emit very harmful gases which in turn affect the human health, environment and economy. In this regards the analysis of EIA ( environmental impact assessment) is becoming important. In this paper, EIA analysis of brick industries located at Bheleguri, Mariani is reviewed.

Keywords: brick, industry, affect, health, environment, EIA.

## Chapter-I

**Theoretical base of the study:**

**1.1 Introduction of the problem:** Environmental laws and regulations in most countries around the world now include the environmental impact assessment (EIA) as the norms for approval of a variety of large and small projects. It is for the projects becoming mandatory that the environmental quality is not seriously compromised when certain types of project are implemented. The problem exactly lies in how an EIA will be prepared, what norms is must satisfy and how it is to be approved.

The problem of approval should not be concern of EIA in pure academic sense. The primary consideration in preparing EIA is therefore, related with the attitude and awareness and to multiply the creative ability for management potentials. The EIA is often used to provide a comprehensive assessment of the potential environmental impacts of industry of size ranging from light to heavy. The need for EIA's the following requirements seem essential:

i) Genesis in a sound statutory process,
ii) A comprehensive list of environmental issues to be covered by EIA,
iii) Clear norms of acceptable risks.

EIA will judge whether the project maintain the basic standards of environmental quality or not. The completeness of the EIA can be easily established through a checklist of items to be fulfilled. The environmental quality maintain by a certain project mainly depends on a) standards of environmental quality and b)procedures to estimate the standards of the quality.

Worldwide, the first explicit requirement for preparing EIA was in U.S. National Environment Policy act of 1989. In India the requirement for an EIA appeared in a Gazette notification in 1994. However, the enacted of the policy particularly in the industrially backward state of India has experienced poor show because of ignorance and also for negligence to promote it as a mandate to the industrial society.

In Assam, the environmental protection act has seldom got any priority before the establishments of either any industry or any project. No proper assessment of environmental impact of industry is made in pure sense rather such environmental clearance certificate is randomly issued following some malpractice and book door way. The NGO's and academicians has therefore, taken over the issues and came forward to make the assessment in a proper and meaningful way.

As part of the environmental studies; newly introduced in the degree syllabus at the colleges, the field study for the preparation of project report has attempted to suit the vary investigations to prepare EIA in the local vulnerable areas. It is observed that during the last decade a good number of brick industry accounting about fifteen has been coming up in the Bheleuguri region located at a 6 km. distance from Mariani. Bheleuguri region is primarily comprised about 7 villages. Agriculture being the main stay of life of nearly 90 percent of dwellers; the region has witnessed a tremendous growth of brick industry within an aerial perimeter of just 3 sq. km. It is quite unprecedented. The gas, ash, smoke continuously emitted for a period of six month from the burning of thousands of raw fuel must have adverse impact on the overall environmental condition of the region. A region economically backward and without having any waste control measure if comes under such hazardous situation will certainly face severe threat from health and hygienic downfall. It is therefore; felt necessary to prepare an EIA for the region as a whole. The primary attempt of this study is to make judicious assessment of environmental impact of the brick industry of the region and to formulate a standard norm to maintain the environmental quality of the region.

**1.2 Objectives:** In order to have a very distinct picture of the environmental impact of brick industries located in the Bheleuguri region few objectives are taken into consideration. The objectives so related will be efficient to fulfill the primary aim of the study. The objectives are:

i) to identify the locational pattern of the brick industries in the region in terms of the land behavior,
ii) to find out the changing pattern of land use in and around the brick industry and to assess its overall impact on the environment,
iii) to ensure the people's perception on the fast growing brick industry in the region and to identify the control measure that the industry has taken up to preserve the environmental quality of the region,
iv) to estimate the economic impact of the industry on the inhabitants settled around the region as a whole,
v) to formulate a plan for waste control measure in order to maintain the environmental quality and to minimize the adverse effect of the industry.

**1.3 Assumption:** Almost 15 brick industry ranging from very small to big having more than one chimney located in a region of just three sq. km. is shocking and a tremendous challenge to the existing environmental norms. It is certain that the continuation of such industrial operation in a densely settled area will divert the entire living condition of the people. With this point of view; the assumption that is formulated for the problem is location of brick industries in the large number within a periphery of three km. is adverse to the existing environmental status and is e-contra to the economy of the region.

**1.4 Data base and methodology:** Data pertaining to the study is collected solely from primary sources. Books, journals and writings are meaningfully dealt with as a source of secondary information in order to augment the base of the thesis. Data are collected primarily with the help of a meaningful and purpose oriented schedule, which is bifurcated in two separate section. One section of the schedule is prepared only to assess the brick industries. In a homogenous topography the standard normal distribution shows 33% of the distribution as acceptable level and hence out of 15 units, 5 units at 35% level of acceptance is selected as sample and data are collected accordingly. As such the part of the schedule prepared for household survey to assess the impact and the perception study random sampling method is used to collect data from the settlement zones.

Data then collected are processed, classified and tabulated to ascertain comprehensive idea on the overall environmental impact of the brick industries. As per the need of the study, analysis, interpretation and explanation and made with meaningful and relevant statistical and cartographic representation of the data and the study. The approach hence, is purely inductive one to justify the study from empirical point of view.

## Chapter-II

**Brief introduction of the study area:**

**2.1 The study area:** The Bheleuguri area is constituted seven villages, which are predominantly rural in character and type. The six villages although all are not revenue villages but these are densely settled and agriculture is their only means of living. Encircled by three tea gardens namely Dihingiapara, Bheleuguri and Khatisona, the area exhibit a total greenish cover along the Dhodar Ali, the backbone for out world communication for the area as a whole. The greater Bheleuguri area is loated between the longitudinal and the latitudinal extension of $94^0 20'$E to $94^0 30'$E and $26^0 40'$N to $26^0 45'$N respectively. Being 3.5 sq. km. in total area coverage, the newly formed brick belt is deprived of having minimum infrastructional need like health service, electricity, drinking water facilities and so on and forth. Academic foundation on the other hand, is based on one high school and four primary schools to fulfill the educational aspiration of the nearly four thousand inhabitants of the area.

Being situated over the old alluvial cover of the Brahmaputra valley the soil is best suited for rice cultivation and hence agricultural activity could not still cross over the subsistence nature in absence of a sound economy, proper motivation and incentives to empower the inability to mobilize scientific knowhow. Favorable monsoon rainfall, although is a boon to the cultivators but lack of modern method of production remain as a major constrains in the path of the growth of sound agricultural economy. The survey conducted reveals that about 30% people are still living in a very standard condition with a per capita of just Rs. 8000-9000 and on the contrary; only 10% of the total population constitutes the middle class section of the area. Most of the cultivators belong to small and marginal land holding group (0-1.0 hectare) practice tenacy to feed their family. A large sunk of inhabitants are managing their livelihood as daily labour and agirl labour. A portion of such a people opt themselves in the brick industry during the dry winter season only.

**2.2 Socio-economic profile of the area:** It is obvious in the survey report that the agricultural economy of the area as a whole has gradually been loosing importance along with the increasing number of brick industry in the area. There were only two or three brick industries at ten years back, which now grow up to fifteen with the involvement of near about 6000 workers. Out of these huge working forces only a few hundred are locally absorbed and most part are hired from Bihar or from Coochbihar of West Bengal. Most of the brick industries are constructed on the land, which were previously used for agricultural purpose, creates a no turn situation for the owner holders. Continuous removal of the topsoil and water logging condition due to heavy monsoon rain during the cropping period has progressively been squeezing the agricultural productivity of the area. As such, the surplus workforce generated due to the shrinkage of agricultural activity could not absorbed by the upcoming labour intensive brick industry of the area. Emission of large mass of oxides and chemicals, spraying of the burnt radish dust into the fields reduces the productivity in large. The major crops namely rice, vegetables and plantation crops produced in the villages has been showing a continuous fall in the productivity because of large scale pollution by the brick industries. The following table reveals that the yield of rice is coming down from 30.21 quintals per hectare in 1990 to 22.50 quintals per hectare in 2005. Alike rice, vegetables and plantation crops has also been showing continuous decline in the production now. Increasing use of chemical fertilizer even fails to raise the productivity of various crops. It, therefore can be conclude that the large scale pollution caused by the setting up of brick industry in the area has already crossed the level of optimum carrying capacity of the existing environment.

Table 2.1: Yield of major crops (quintals/hectare), 1995-2005.

| Crops | 1995 | 2005 |
|---|---|---|
| Rice | 30.21 | 22.50 |
| Vegetables | 108.35 | 91.24 |
| Plantation | 85.69 | 74.81 |

It is here to mention that the uncertainty in the agricultural sector creates a large number of agirl labour in the area who are infact, deprived of having a part time earning source in the brick industries in the name of so called unskilled worker. A very minute portion of

such surplus agirl labour has occasionally been absorbed in the industries as daily wage labour. The economy of general labour people thereby entered into the crisis of no return.

## Chapter-III

**Analysis on the experiments and findings:**

**3.1 Impact of brick industry on the environment of the area:** EIA is a formal study process used to predict the environmental consequences of a proposed or already developed project. The check list method employed in this study at first identifies the parameters for investigation. The environmental parameters are measured and interpreted to detect whether the developed brick industries have either adverse effect or no effect on the overall environmental condition of the area. The parameter thus selected primarily are number of settlement dislodged, change of land use, impact on agriculture, effect on environmental quality etc. The table 3.1 illustrates the vary impact of brick industry on the environmental situation of greater Bheleuguri region.

Table 3.1: Impact of brick industry during constructional phase.

| Industrial unit | No.of settlement dislodged | Effect on land use | Quality of Agirl practice | Environmental quality | Human perception |
|---|---|---|---|---|---|
| Unit-I | 20 | Adverse | Adverse | Degrading | Satisfactory |
| Unit-II | 12 | Adverse | Adverse | Degrading | Satisfactory |
| Unit-III | 8 | No effect | Adverse | Degrading | Satisfactory |
| Unit-IV | 25 | Adverse | Adverse | Degrading | Not satisfactory |
| Unit-V | 5 | No effect | No effect | Constant | Satisfactory |

Examining the qualitative statements of people dwelling surrounding the industries in different villages give some clue for further in depth analysis particularly in case of their perceptibility regarding the upcoming huge number of brick industries out of a total of fifteen units established in the area reflects a hazardous situation of existing norms of environmental quality. Using a total of 21.0 hectares of land, these sample units already dislodged 70 numbers of settlements and incurred a tiny consolidated compensatory amount to the dislodged families. The big units in general leased in the land for the establishment of industries as well as uses land as raw materials for bricks which is also done at a very cheap rate when compared with the quality of the total loss. On the other hand, most of the settlers near brick industries express their satisfaction for the establishment of brick industries but the economic benefit have been defied at same time.

It is quite obvious that there prevails a total adverse situation in land use, agricultural production, health and hygiene and so on. The survey conducted in this purpose confirmed it that nearly 80% people confessed the changing situation after the establishment of the brick industries in the area. It can distinctly be examined in table 3.1 where the change of land use pattern and the amount of land brought under the use of brick industries are extremely speculative in a small area of just 5.0 sq. km.

Table3.2: Changing land use under the Brick Industries.

| Industrial unit | Use of land (hectares) | | | Loss of open space | Recreational ground | Settlement area |
|---|---|---|---|---|---|---|
| | Agirl land | Forest land | others | | | |
| Unit- I | 27.0 | 2.0 | 1.0 | 2.5 | -- | 18.0 |
| Unit- II | 12.0 | 4.0 | 5.0 | -- | 2.5 | 12.50 |
| Unit- III | 30.0 | -- | -- | 4.3 | -- | 10.09 |
| Unit- IV | 42.0 | 8.0 | -- | 3.5 | -- | -- |
| Unit- V | 30.0 | -- | -- | -- | -- | -- |
| Total | 141.0 | 14.0 | 6.0 | 10.3 | 2.5 | 40.59 |

A cautious look into the table 3.1 reveals that the total amount of land used by the brick industries are mostly agricultural field which constitutes 68.43% of total used land and remaining are also previously used for various other meaningful purposes. It is seen particularly in these five sample industrial unit that the net loss of fresh forest accounts 14 bigha is directly adverse to the situation of demand where forestation instead of deforest is a prior compulsion before establishment of industry in order to minimize the environmental risk.

**3.2 Degraded quality of air and water:** In order to confirm the subsidence of environmental quality, air and water used to be the effective determiner. Minute change in the air and water can be detected with help of sophisticated scientific technique and the pollutants are identified. In absence of effective scientific know how the pollutants are determined on the basis of some observational test which are carried in three cites of the study area. Air pollutants are identified with the help of wet paper test and smell procedure while the chemical action of pollutants is observed in the field with the help of a test conducted on the green cover of the area.

In this process, three cites namely sample industrial unit II, IV and V are selected to conduct the wet paper test and other observational test. The results of the test are shown in the table 3.3:

Table 3.3: Results of quality test at three-sample unit.

| Sample unit | Particulate matter | Odors | Gases present |
|---|---|---|---|
| Unit-II | 336 ppm | Burning | Oxides of sulphur, carbon, nitrates present in the air |
| Unit-IV | 401 ppm | Burning and hydrogen sulphide | |
| Unit-V | 301pmm | Burning | |

**3.3 Pollution related health problem:** The adverse impact of pollution is best seen in the situation of health and hygiene of an area. The brick industries located at Bheleuguri in large must have some disastrous impact on the social health of the area, which need special investigation to confirm it. Accordingly the investigations made in the area reveals that the incidence of pollution oriented disease have been increasing at a tremendous rate. The region observes a 30% growth of air born diseases during the operational phase of brick industry, which in fact, effectively conduct operation within the month of September to April. As such, water born diseases like dysentery, gastroenteritis, skin diseases are alarmingly rising at the rate of 25.69, 14.52 and 7.82% respectively during this year. The highest numbers of cough patients are registered during the last two years because of increasing number of brick industries, which has intensified the pollution, and in consequence the health situation is fast deteriorating. The following table illustrates the consequence and impact of pollution caused by the continuous emission of smoke, gases, suspended particles, ashes etc. by the brick industries in the entire region.

Table 3.4: Percentage of people affected frequently from diseases.

| Diseases | % of people | Diseases | % of people |
|---|---|---|---|
| Cough | 45.21 | Dysentery | 25.69 |
| Cold | 22.01 | Gastroenteritis | 14.52 |
| Tuberculosis | 12.45 | Skin disease | 7.82 |
| Bronchitis | 5.69 | Respiratory problem | 4.68 |
| Asthma | 7.82 | | |

With the removal of vegetative covers, shrinkage of green agricultural field, declining productivity with the growing number of brick industries within this small patch of areal coverage are significant to cause large scale pollution in absence of proper pollution control measure. The increasing number of air and water born diseases in the area by and large approved a dismantling environmental condition in the region. Apart from thus fuel used in the brick industries are collected at a large scale from the Gibbon Wildlife Sanctuary situated at a close proximity near about 1 km. distance from Bheleuguri which in turn, pose a severe threat to the ecosystem of the wildlife sanctuary.

## Chapter-IV

**Summary and conclusion:**

Bheleuguri, a region of seven but small densely populated villages has been witnessing a remarkable growth of brick industry brick industries accounting almost fifteen within an area of just 3.5 sq. km. The number of brick industry increased from three in 1995 to fifteen in 2005 which creates problem in the sustainability of environmental condition. Environmental impact analysis there by become necessary to examine whether the pollution level overrides the normal carrying capacity of existing natural environment or not. Being fed by a rich green cover and extensive agricultural field the tolerance level of the nature has been twisting with the increasing number of brick industry.

The schedule prepare for EIA analysis has attempted to score maximum of the objectives fixed for the study. The first part of the schedule is adjusted to collect information about the individual unit of industry while the second part is used to deal with the inhabitants of nearby villages. The topographic homogeneity of the area as well as the uniform population structure makes the assessment feasible and conclusive. The region during the last ten years period has been witnessing the growth of brick industry in this Bheleuguri region is obviously due to the congenial soil condition, which is commonly found available at the location site and thereby it reduces the transport cost. The second important point to be noted is that it is located at the five km. distance from Mariani railway junction and the important link road of eastern Assam border, the Dhodar ali crossing over the heart of the region. With all these favorable factors the brick industry has grown up in the area at a large number.

Being the adjacent area to the Naga thrust, a rich deposit of coal, having rich forest cover in the surrounding area and fueled by inter-state market of high demand brick industry in Bheleuguri enjoys the optimum scope for elite growth. Engulfed by large number of densely populated villages, the industrial units in the region have been imposing a cumulative effect on the environmental condition of the region. Climatic indifferences from prevailing condition of the Brahmaputra valley the entire region prohibits the year long operation of the industry which in fact, as some positive effect on the overall nature and hence reduces the high risks of environmental pollution.

It is however, noticed that the ecology as a whole is in turmoil with increasing bricks industry. Ecological set up has been getting a continuous change under the operational and constructional activities of the various unit and creates instability repeatedly once in a year. It is apprehensible from the existing situation that the impact of brick industry as a whole is adverse to the demand of nature and environmental quality of the region altogether is degrading at very faster rate. The loss of agricultural land, shrinkage of forest cover, continuous emission gases, ashes, particulate matter, dust etc. adversely affect the general natural health of the region. The indicator used to analyze the environmental impact of brick industry is conclusively adverse and sufficient to approve the assumption of the study.

## Chapter-V

**Few suggestive measure:**

On the basis of ongoing analysis and observation few suggestive measure have been formulated in order to keep the natural environment intact in the region along with the industries and developmental activity. With fulfillment of three measures partially or wholely there can be retained the environment having no severe threat to the region and it will certainly help to go with the concept of the sustainable development. Although the EIA at present is found totally opposite to the previously existing one but the measures derived on the basis of the analysis of the quintessence of the socio-ecological set up of may able to sustain the nature at its requisite level. The suggestive measures are:

i) The number of brick industry should be reduced to three or four only. Other units may merge with the big unit and allow them to work as raw brick manufacturing unit to sustain the economy of the region.

ii) The brick industries work as complete and independent unit should use fixed chimney and the minimum height of those should not less than 80 feet in average.

iii) Heavy plantation is necessary particularly around the manufacturing unit to prevent the spreading of dust, smoke and ash at the surface level of atmosphere and at the same time the plants work as an active absorber of smokes and gases of oxides.

iv) Maximum labour should be locally recruited to benefit the local economy and medical check up camp, if possible, should be arranged particularly in the last phase of the operational period.

v) Environmental monitoring system along with the waste control measure should be installed to encumber further destruction of the environment.

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