

## **Human and Environmental Dimensions of Brick Industries in District Murshidabad, West Bengal**

### **ABSTRACT**

India is the second largest producer and consumer of fire clay bricks in the world after China, has more than 100,000 small and medium-size brick producing units produces about 140 billion bricks annually to meet the demand for urban expansion and infrastructure development. Majority of the brick manufacturing units is spreading across the states like Punjab, Haryana, Utter Pradesh, Bihar and West Bengal (Ghoshal 2008). West Bengal has more than 3500 brick manufacturing units produce 300 crores bricks annually (Bera 2010). According to the recent data, the district of Murshidabad has 670 brick manufacturing industries (Office of the SRO 2015). Almost all the brick industries located on agricultural land in *Bagri* region of the district.

The establishment of brick industries has brought many adverse consequences in the district like land degradation, resources depletion, environmental pollution, etc. Therefore, this study tries to critically examine the role of different agencies involved in the development of brick industries, its production process, labour market, social relation of different groups involved in the brick industry. On the other hand, the study attempts to examine the impact of brick industries on air, water and soil pollution, and land degradation, agriculture practices. This study is broadly divided into two main sections. The first section deals with introduction of study, objectives, research questions, database, methodology, literature review, brief description of district Murshidabad and study blocks namely; its physical characteristics, soils, population, workforce structure, trends and pattern of workforce structure. Further, this section incorporates the spatial and temporal distribution, types, production

mechanism, nature, pattern and status of brick industry and identify and critically examine the role of different agencies involves in the development of brick industries in the district of Murshidabad.

While second section deals with examine the impact of brick industries on local landless labourers, marginal farmers and society; environmental degradation, agriculture practices, and the challenges face by the farmers in agricultural land management. Further, this section also incorporates the summary of findings, suggestions and conclusion. To fulfil the requirement of objectives the data has been collected from both primary as well as secondary sources. The primary data have been collected through interviews, questionnaire survey and case studies. Secondary data have been collected from different Government departments, Agriculture Census of India (2001 and 2011) and Census of India (1991, 2001& 2011).

Further, soils and water samples have examined to generate first hand data to support the studies. In order to understand the nexus among the different agencies working for the development of brick industries in the area of study, qualitative narrative method has been utilised. Information has been gathered through discussions with the owners of brick industries, along with farmers, contractors of labour and land (soil suppliers), brick businessman, fuel suppliers, local force groups and heads of the local Govt institutions (gram Panchayat, Dept of Land and Land Reform, Dept of Forest & Environment and District Pollution Control Office). Case studies have been referred to collect information about the contribution of brick industries in the life of labourers and farmers and also to know how they have become a part of the industries. The collected information is described in a sequential manner to fulfil the first objective. Further, to understand the shifts in the social relations, this study examined the power relations between the brick kiln owners and the farmers in

terms of resource transfer in the form soil and land. In this regards caste, class, religious and economic background of both groups and its spatial dimension have been analyzed. Furthermore, the dynamics of labour market and the changing mode of production system have been taken into consideration to understand the shifts in the economic relation. The issues like nature and pattern of labour contract and the labour movement as well as the occupational shifts among the landless labourers, their daily wages and wage differences with respect to their previous works, the changing socio-economic condition of the people like labourers and farmers due to emergence of brick industry; following parameters such as housing, occupation, income, shift in economic activities expenditure, sanitation, water supply for labourers and religious background, caste, housing, water supply, sanitation, land holding pattern etc for the farmers have been taken into account.

Further it is to be noted that certain techniques descriptive statistics, crosstab, custom table of SPSS uses to calculate the share of different categories under the different set of parameters. Arc-GIS tools and techniques were used to map the study blocks and the location of the brick kiln industries. The study area is mapped with the help of base map collected from the Survey of India (Kolkata). After that location of sample industries were collected with the help of GPS. Later on, the collected points (location) were converted into shape file with the help of Arc Tool. Finally, locations of brick industries in the study have been mapped.

Study shows that the new economic policy (1991-1992) brought rapid growth of urbanization and infrastructure development with other economic activities. The rapid growth of urbanisation and infrastructure development accelerates the demand for building materials including bricks. Therefore, number of brick kiln industries

flourished to fulfil the demand of bricks. In addition, the demands of brick also increased among the villagers due to the improvement of social – economic condition.

Study shows that, majority brick industries in Murshidabad district spread across the vast area of *Bagri* region of the district and exploits the agricultural top soil. The brick industries grew steadily during 1980-1990s. The highest concentration of the brick industries is found in the blocks like Berhampore, Domkal, Hariharpara, Jalangi, Raninagar, Beldanga, Lalgola, Murshidabad- Jiagan, Nawda etc. Among the study blocks, the maximum number of brick kiln industry is found in Berhampore followed by Domkal and Murshidabad- Jiagan. The maximum number of unauthorized industry is also found in Berhampore followed by Domkal and Murshidabad-Jiagan.

The discussion and valid classified documents provided by the Government authorities (Office of the SRO and DL& DLRO; Berhampore, Murshidabad) as well as data collected from the field investigation, it is safely stated that each and every agency has played their critical role in the brick industries and its development. To establish a brick industry owners start his journey from Gram Panchayat to Land and Land Reforms. After getting clearance from the Land Reform Department owner reach to Pollution Control Board, after getting clearance from it then reach to Department of Environment and PWD and Trade Licensing Authority to getting permission to produce and sell brick under his own Brand name. Mean while others stakeholders like local politicians, Labour contractors, Land contractors, Trucks and Tractors Owners, Small Businessman, pressure group (*Mastan*) have play their crucial respective role in the development of brick industry in the study area. Each of them tries to find out their personal source of income either directly or indirectly by involving them in the brick industry.

The Government authorities have tried their best to extend their support to the brick industrial owners by ignoring the important facts related to agricultural land use, land conservation and environmental protection. So we can assume that either Government either simply ignore the interest of the larger section of the society or very much reluctant to protect the interest of brick industrial owners or unable to take any action against the violators. These politically influential brick industrial owners may influence the government authorities to make the rules flexible at ground in respect of brick industries.

Thus it is all about corrupt political culture of the state where financially influential people are able to manage the policy implementing authority at ground in favour of them. The owners of the brick industries wisely exploit the corrupt system to run their industries without obeying the rules and regulation. They are also able to manage a network to take advantage of the financially stressful small and marginal farmers to exploit their land with the help of land contractors. Further, the supply of cheap landless labour by the labour contractors added additional advantage to these owners to make the use of them in exploitative production process. The absence of any form of union with regard to these labourers further expands the scope of production and reproduction. In addition to these government agencies, a considerable number of private agencies or stakeholders like the small, petty businessman, soil (land) and labour contractors as well as trucks and tractors owners played their respective role in the development of the brick industry in the district of Murshidabad.

Furthermore, association of the owners with the ruling political party and active donor of ruling party allow the owners to ignore many functional issues regarding brick industry. In addition to it, making soft target by the industry to the people who are really concerned about people and environment prevent them to act

against the industry. The continuous surveillance on researcher and other people those are working on different aspects of brick industry prevent them (researcher) to get desire information. If anyhow they manage to get the desire information, the Brick Field Owners Association requests the scholar not to use harsh language or not to write harsh reality of brick industries. On the other hand, they are trying to convince the researcher to work on the positive side of the brick industry.

Therefore, the result of mutual support and co-operation helps in rapid development of brick industry in the district of Murshidabad. The development of brick industries have brought many changes in the study area in respect of landless labourers, small and marginal farmers, agricultural practices, society and environment. Study shows that the majority of the brick industrial labourers belong to the social- economically poor and marginalized section of the rural society. The rapid development of the brick industry has changed the structure of economic activity and production system in the villages in relation to the landless labourers. The division of labour is very much sharp in the brick industry. The major chunk of these brick industrial labourers belongs to the young and youth age group. Youth and energetic people employs to perform the hard manual works like soil quarrying, moulding, shaping and transporting whereas aged and skilled people are appointed as mistry and firemen. The brick industry has provided 150 -180 days employment to the landless poor agricultural labourers.

The income of these brick industrial labourers ranges from between Rs. 5000-9000 per month. The majority of brick firemen and makers have monthly income is about Rs 7001- 9000. Similarly, the monthly income of Mistry and Rubbishmen ranges from Rs. 5000- 7000. In addition to it the income of brick transporters varies from individual to individual because the payment is based on number of bricks

transported/carried by each individual and ranges between Rs 4500- 7000. The income from the brick industry constitutes major part of annual income of these labourers. Study also reveals that major portion of the yearly income spent to buy food and allied items. A small part of their income is remained available for spending other sectors like children education and improving sanitation.

Study further demonstrates that though number of brick industrial labourers has shifted their house from the Kachha to Semi Pucca and semi Pucca to Pucca house but still a significant percent of labourers are living in Kachha houses. The share of semi Pucca and Pucca houses are higher among the brick makers and brick firemen due to relatively good monthly income from industry. But, still a considerable percent of brick industrial workers' don't have the access to the improved sanitation facility.

Study also shows that majority of these workers were depending on agricultural daily wage labour, daily casual wage labour, daily wage from other sectors, and daily wage labour from construction sector before join in brick industries as labourers. The brick industry has changed the production system in the study area in relation to the landless labourers. Earlier these labourers were mainly engaged in agricultural and allied based production system but now major part of their yearly labour devoted to industrial based production process.

Likewise local landless labourers, considerable number of small and marginal farmers of study area are getting an opportunity to lease out part of their land and generate good amount money which for time being may helps to meet many essential needs like celebration marriage ceremony, paid dowry (mainly for daughter), repay the existing debts, treat illness, meet expense of children education fee, build new house, etc. Study also reveals that brick industry also employed few migrant labourers

coming from the states like Jharkhand, Bihar and (a small percentage) Eastern Uttar Pradesh. Study further reveals that the majority of these migrant workers recruited by the labour contractors and very few of them come with their fellow workers who are already worked in different brick industries. The study also unfolds that though they are coming different states like Jharkhand, Bihar or Uttar Pradesh but so many things are very common among them. First, all of them belong to socio-economically deprived section of society. Second, either they are working as firemen or brick makers. In addition to it commonality also found in terms of expenditure. Majority of them are net buyer of food items throughout the year hence significant part of their income spend on buying food items. Moreover, majority of these migrant labourers are still living in Kachha or semi Pucca houses.

Almost all of them are deprived of basic facilities like good sanitation, safe drinking water supply, health facility in both the places; inside brick industries as well as at their native villages. The concept of decent work is totally absent in relation to brick industrial workers (local as well as migrant). They are deprived from all type of socio-economic benefits like pay leave, parental leave, bonus, gratuity, medical facility for family and children, old age pension etc. They are left behind from the all social dialogue like negotiation on daily wage, time of work duration of work etc. Lack of awareness about the rights, lack of organizational capacity absence of support from other agencies like trade unions and NGOs prevent them to gets their due benefits.

Above all, informal nature of operation, exclusion of brick kiln from the domain of industry and factory laws, organizational and political influence of owners on the institutions and absence of labour union and organize voice in favour of these workers causes of deprivation from their due benefits. As a result of lack of basic

work place safety measure, deprived from available equipments and lack of awareness exposes the industrial labourers numerous occupational health hazard. The health problems among the labourers are very much related to their task performed inside the brick industry. Majority of brick makers, rubbishmen, and brick transporter suffers from joints related problem whereas mistry and firemen exposes from health problems like suffocation, eye irritation skin burnt, etc. The Works of Singh and Asger (2002), Joshi and Durani (2008) Manga, Singh, Bhardwaj and Singh (2012) also reported similar results on occupational health problems of brick industrial labourers. But function of brick industries also brings number of challenges in the study area in relation to environmental degradation and agricultural practices.

Study further demonstrates that the function of brick industry is an important contributor for the increasing concentration of the  $\text{CO}_2$  and the SPM in the local air and atmosphere. The discharge of the huge amounts Suspended Particulate Matter (SPM) and the  $\text{CO}_2$  into the local atmosphere significantly increase the concentration of the  $\text{CO}_2$  and SPM and reduced the quality of the air and the environment (Pandey 1997; Asger 2004; Joshi and Durani 2008, Baum 2010, Avitia, Antonio & Mora 2012).

The discharge of the Carbon dioxide and the SPM into the local air is responsible for hazy condition at local atmosphere during the winter season. Such hazy and smoky weather prevent sunlight to reach the ground as well as reflect it back to the space (Asger 2004). The rising level of SPM due to brick kiln activities not only affect the local atmosphere, but also these SPM travels with the wind and affects the distant places, vegetation, standing crops and water bodies (Avitia, Antonio & Mora 2012). The presence of physical parameters like water pH, EC and TDS as well as chemical elements like Na, P, K, Ca, Mg, and Cl have subsequently increased in

the surface water bodies located close to the working brick industry due to mixing of pollutant materials with water. The increasing level of these elements in the water bodies directly affects the local aquatic ecosystem (USAID 2003). In addition, the pumping of ground water by the brick industry is responsible for depletion for ground water (Santosh, Padmalal, Baijural and Maya 2012). Therefore, the brick kiln burning is responsible for the changing neutral soil into the toxic, raising concentrations of the  $\text{CO}_2$  and the SPM in the air and chemical and physical changes in the surface water bodies in the study areas.

In addition to it the brick kiln burning is responsible for the increasing toxic level in the soil adjacent to the industries as well as degraded considerable areas of agricultural land and depleted the availability of soil Nitrogen, Phosphorus and Potassium. The degradation of agricultural land and depletion soil fertility due to reckless quarrying, a considerable area of agricultural land turned into degraded land year after year in the respective study area. The removal of the top layer of soil by the brick industries has not only reduced the availability of agricultural land in the study area, but also responsible for changes of an essential plant supporting elements in the soil like Nitrogen, Phosphorus, Potassium etc (Grewal & Kuhad 2002 & Khan, Rahaman, Rouf, Sattar, Oki and Adachi 2007). The study reveals that the soil of the study area is neutral to basic in nature. The pH value of all agricultural soil in the study area lies in between 7.43 – 7.71 which is neutral to the basic soil. But quarrying activities significantly raised the pH value and turned the neutral soil into basic to the strong basic soil. It is also observed that the deep quarrying activities changed the soil pH level beyond 9 and above.

In case of other nutrients, the topsoil quarrying activity significantly reduced the available amount of Nitrogen, Phosphorus and Potassium. The losses of

agricultural land fertility adversely affected the soil quality and agricultural practices in the study areas (Grewal & Kuhad 2002). The removal of top soil by brick industrial quarrying causes of steep change of slope within the small area. The changes in slope altered the lands orientation in the study area. The farmers (the respondents) reported that the changes in relative slope and slope direction have an adverse impact on their land management practices. After top soil quarrying their land became relatively deeper than the land of immediate farmers. The new orientation of their land forces them either change the source of irrigation or relocate their irrigation sources and systems. In addition, land boundary management becomes a new emerging challenge for the farmers. During the rainy monsoon season these steep slopes accelerated the flow of rainwater to downwards and remove huge amounts of in compact soil and responsible for loss of fertile layer.

In addition to it the changing slope and land orientation ultimately forced the farmers to change the agricultural land use practice in the study areas. The land which is normally used to grow vegetables, potato, brinjal, lady fingers, onions, chilly, pulses jute, etc. during rainy season now all these crops are replaced by the paddy due to water stagnation in the agricultural field. The water stagnation is harmful for the standing crops and it damages the natural growth of those standing crops. If there is an early monsoon then the entire crops spoiled or immature crops harvested and it is a matter of economic losses. To avoid such risk and economic losses farmers are trying to adjust themselves by replacing crops like paddy in summer and wheat in winter.

In the case of cultivation of food crops, the amount of investment goes too high and reduced the yields and affects the profit margin due to loss of crop supporting soil nutrition. The losses of crops, supporting top fertile layer not only affects the yields of the crops but also significantly changes the agricultural land value

in the study area. Further, water logging is a newly emerging phenomenon in the study area because of appearance of degraded, fragile landscape in the study area. Water logging means the flooding of the lower area during the rainy season. The changes in the slope and altitudes of existing high land into low land after top soil quarrying, rain water gets accumulated in the quarrying land.

The accumulation of rainwater on quarry lands, cultivation of such land became a risky task for farmers. This temporal water logging on their agricultural land frequently delayed the crop sowing time. Sometimes water logging situation remain for few month causes of loss of one or more crop. It is also found that standing crops are getting damaged due to sudden rain. In addition to this, farmers having their land immediate to top soil quarrying land also faces the problem like top soil erosion, boundary damage, loss of irrigation water mostly due to land boundary failure. Sometimes these top soil quarrying lands left in an abandoned condition which have put numerous challenges to the farmers to reclaim such land for further agriculture.

**Thus**, the development of the brick industries in the study area are accompanied by the contribution and cooperation of the numerous agencies and groups from the Governments, private and individuals as well as continuous rising demand for building materials among the people within and outside the district.

The function of brick industries provides an opportunity for the thousands of landless labourers to get an employment for a period of 5- 6 months at their doorstep which prevent them from the out-migration for time being. In this way by employing in brick industry, gradually replaced the production relation of these rural landless labourers from agriculture based production to industry based production system. Though, brick industries provides few thousand employments to the landless and casual daily labourers from the local villages as well as few hundred migrant

labourers coming from the nearby district and the states but, industry does not bring any radical change in the life of these labourers due to its exploitative nature.

As a result, these labourers are still living with lack of basic facilities and struggling for fulfilling their daily basic needs. The exploitative, captivate and controlling nature of the production process as well as an advance payment system in brick industries are the main hurdle for the labourers to get out of the vicious cycle of poverty. Brick industries also offered an opportunity to many farmers to generate a quite good amount of money by lease out a portion of their land which helps them to get escape from economic stress and poverty for time being or build a small house or repay the existing debts or celebrate social functions or paid the offspring tuitions fees; but it permanently degraded important source of livelihood which put them under further marginalization by making their agricultural land infertile, fragile, degraded, marginal and unsuitable for many crops but as well as by puts a numerous hurdle in front of them to reclaim their already degraded land.

In addition to it the ignorance of the functional guideline regarding soil utilization and exploitation of top agricultural soil by the brick industries further intensifies the adverse impact of brick kiln quarrying on agricultural practices. Thus, brick industry gradually putting these small and marginal farmers in vulnerable situation with regard to their future livelihood.

On the other hand, the function of brick industry helps in capital formation for the owners of the industries. The under wages and profits are the two important sources of surplus capital generation for the owners. Further, brick industry also helps in transfer of ownership of land resources by exploiting the land of poor farmers in the study area. Furthermore, function of brick industries help in emergence of new classes in the village in the form of capitalist owners and voiceless, poor, unskilled

labour class. As a result, social relations of these people are largely getting changed. Now these owners are the main actors of decision making in the villages.

The unchecked growth and the use of traditional technology in the brick kiln burning are responsible for the generation of huge amount smoke, carbon dioxide, SPM and other gases. The discharge of these pollutant materials into the local environment is responsible for changing the quality of the soil, water and the atmosphere. The changing quality of the soil, water and air has an adverse impact on the human health.

Moreover, the uncertain nature of brick industries with regards to function and will create the situation for free labour by adding additional few hundred small and marginal farmers as landless labourers in near future. Therefore, to keep away from the above such possible future adverse outcomes from brick industries in the study area; Government should ensure that the brick industries should avoid the use of agricultural land for top soil quarrying as well as adopt available alternative raw materials based bricks production.

In this regard, fly ash based brick manufacturer is an important alternative. It was found that the fly ash brick is relatively cheaper than the fire clay bricks, yet people prefer to use the fire clay bricks due to prevailing popular notion about the highest longevity of the fire clay bricks as compare to the other available alternative form of bricks including fly ash bricks. It is due to colonial influence in the mind of the people. The common belief among the people is that the brick with '*Red bright Ring Tune*' is a best building material with high longevity. This perception and notion should be changed.

In this regards, media can play the positive role to change the people's perception by popularizing the utility and benefits of the Fly Ash bricks as well as

other alternatives from of building materials which can reduce the pressure on agriculture land for raw materials. On the other hand, switches from the traditional brick kiln burning techniques to the improved Vertical Shaft Brick Kiln (VSBK) technology may reduce the fuel consumption by 40 - 60 percent energy as well as the same amount of pollution load in the form of carbon dioxide which is ultimately reduced the severe environmental implication.

The ill and irregular implementation of Government rural employment programmes, political biases towards the village poor by the ruling parties, irregular and long waited payment or payment procedure discourage these landless labourers to join the Government run rural employment scheme. On the other side, regular payment system in the brick industry encourages these landless labourers to work in such hazardous and exploitative Industry.

Therefore, proper implementation of Government employment scheme could help these landless labourers to get out the labourers from this exploitative Industry. In this regard, taking brick industry and its labourers under industrial laws could minimize the level of exploitation as well as help these labourers to get their due benefits. Government should encourage the owners to establish agro based industries by providing the tax holiday and subsidy to accommodate the rural surplus labour forces. Every one of us needs development; but it is not in the cost of others. Development should be inclusive and sustainable.