

Implication of National Strategies to Reduce Environmental Pollution from Brick Industries at Local Level

Mowshumi Sharmin¹, Rafiul Islam² and Dr. Mahfuzul Haque³

¹ Bangladesh Institute of Governance and Management (BIGM)

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Abstract

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Index terms— brick kilns, environmental pollution, urbanization, legislative process, GHG emission, national strategy

1 Introduction

Brick industry is one of the largest informal industrial sectors in Bangladesh contributes to 1% of GDP. Brick industry is expanding due to the expansion of the real estate sector while compromising several environmental and social consequences. To modernize the industry and to manage the environmental pollution, the government amended the Brick Burning Act 1989 and issued a number of orders following by enacting the Brick Manufacturing and Establishment of Brick Kilns (Control) Act 2013. The current study aims to understand the implications of regulatory changes in Brick Sector at Faridpur District based on primary and secondary data and identified around 66% brick kilns transformed into modern technology like zigzag and total 23100 tons of GHG emission has been reduced per year. At local level, technological availability, finance, government law and policy enforcement for pollution control, role of local DoE and administration, education and leadership of the local Brick Manufacturing Owners, etc. have influenced the adoption of modern kiln technology. Besides, the government has changed the brick kiln technology very fast. An incremental emission standard should be deployed to improve the energy efficiency of the brick sector.

Keywords: brick kilns, environmental pollution, urbanization, legislative process, GHG emission, national strategy.

Brick industries are identified as one of the major environmental pollutants in Bangladesh. Every year five thousand brick industries burn almost 3.8 million tons of coal and another 1.9 million tons of wood indiscriminately to meet the demand of 400 to 1200 tons of fuel to produce 17.2 billion bricks emitting 9.8 million ton of CO₂ and 170 billion g/m³ of particulate pollution (World Bank, 2011). The emission from brick industries is causing serious health threats to adults that harm their eyesight, lungs, and throat as well as stunt the psychological and physical development of the children (Guttikunda & Khaliqzaman, 2013). Brick making subsidizes a lot to the construction sector and contribute 1% of the country's Gross Domestic Product (GDP) or \$245 million (2010) but it is not formally recognized as industry (World Bank, 2011).

In Bangladesh, brick fields are the main supplier of building material. The country's overwhelming dependence on bricks is due to its lack of stones in any sizable quantity or other alternative building materials at a comparable cost (World Bank, 2011). To attain the target of sustainable growth in the country and to achieve the efficacy in the building material sector, there is an urgent need of improving the brick industries in the country.

In the country, there are generally six types of brick kilns: (i) Bull's Trench Kilns (BTKs), (ii) Fixed Chimney Kilns (FCKs), (iii) Improved Zigzag Kilns, (iv) Vertical Shaft Brick Kiln (VSBKs), (v) Hoffman Kilns, and (vi) Tunnel Kilns. Among these technologies, 92% of the total 5000 brickfields are highly polluting FCKs. More energy efficient and less environment polluting improved zigzag kilns, vertical shaft brick kilns (VSBKs), hybrid Hoffman kiln (HHKs), and tunnel kilns are rare (World Bank, 2011).

An expansion in the real estate sector of Bangladesh encouraging brick industries to grow abundantly stimulates the process of urbanization and economic growth sacrificing several environmental and social consequences. For

5 OBJECTIVES

46 developing countries like Bangladesh, air pollution is acting as one of the main problems of environment pollution
47 and brick industries are identified as major contaminants in the vicinity of the cities of the country in the name
48 of progress. Discharge of huge quantity of toxic elements from brick industries causing serious health threats
49 polluting the environment.

50 In order to protect the environment, the government of Bangladesh is trying to compress down the brick
51 industries through regulations and encouraging the use of cleaner technologies. There is a lack of government
52 policy to support a long-term brick sector development strategy. As a result, the legal and regulatory framework
53 does not adequately address the relevant energy efficiency guidelines and other Volume XVIII Issue IV Version
54 I underlying development constraints. However, the existing legislation is based on the Brick Burning Act
55 (1989) and various amendments and circulars after that. Though in place, these legal frameworks have not been
56 effective to encourage brickfield owners to switch to the most efficient technologies and reduce pollution. The most
57 concrete step taken by the government is the 2010 government notification that banned the operation of FCKs
58 by September 2013 (ADB, 2012). Due to the stilldeveloping economy, businesses often choose cheap, though
59 inefficient, operational techniques to reduce costs. Most brickfields are informal, small to mediumsized businesses
60 that operate with outmoded technologies, are severely polluting, and have poor labor standards. Hence, the
61 country's inability to develop an energy efficient, clean and modern brick sector is a sign of market failure, and
62 is a result of general lacks of (i) awareness of available modern technologies, (ii) technological and operational
63 capacity, and (iii) targeted finance.

64 After 2013, old kiln technologies are banned and the government is enforcing the proposed three new brick
65 field technologies without having any comprehensive brick sectoral road map or plan. Therefore, brick sectoral
66 upgradation only through legislative change is quite challenging, and the level of upgradation is an objective of
67 this study. The current study looked into the implication of legislative changes as well as the factors which could
68 support the upgradation of the brick sector at local level in Faridpur district.

69 This paper is organized as follows. Section two summarizes existing empirical evidence and section three
70 presents the objectives. The remainder of the paper includes research methodology in section three, findings and
71 discussion in section four and conclusion and some policy recommendations of the study are drawn in section
72 five.

73 2 II.

74 3 Existing Empirical Evidence

75 The study reviewed a number of literatures mainly on the brick sectors. The study has reviewed papers and
76 public form World Bank, ADB, and the SAARC. The review is done to capture the current scenario of the Brick
77 sector in Bangladesh. World Bank (2011) published a comprehensive report on the brick sectoral situation with
78 a set of the policy measure to be taken to make the sector energy efficient. ADB (2012) has analysed the current
79 situation along with the legislative development process to prepare a feasibility study on the sector for developing
80 investment project. SAARC (2014) Energy Centre in Pakistan prepared a detail sectoral study compiling all the
81 available information including World Bank, ADB, and other institutional research documents. BUET (2007)
82 ??013) is provided for the control of activities relating to brick manufacturing and brick kiln formation and to
83 reenact with some modifications by annulling the prevailing act. It is necessary to establish control over brick
84 kiln establishment for the conservation of environment and biodiversity.

85 In summary, from the aforementioned existing empirical literature, it is evident that there is a substantial
86 amount of empirical literature showing the brick field scenario particularly on Bangladesh but very few studies
87 concentrate on the implication of national strategies. This study endeavors to give an inclusive scenario of the
88 implication of national strategies. This study has reviewed all these documents to develop the objectives and
89 methodology to carry out the current study.

90 Although the study tried to analyze both the primary and secondary information to document the current
91 brick sectoral scenario in terms of size, employment, production, technology used, efficiency of fuel burning and
92 environmental pollution etc. and side-by-side the legal instrumental development to promote the sector as an
93 efficient one in the country but it has some limitations also. The study has been done by focusing on the few key
94 literatures. If there were a process of information collection form the key stakeholder at the national level, then
95 the study findings could be further improved.

96 4 III.

97 5 Objectives

98 The aim of this study is to find out the current scenario of brick industries in Bangladesh and to analyze the
99 impact of national brick sectoral strategies at Faridpur district (local level). However, the specific objectives of
100 this study are the following: i. To study the current scenario of national brick industries and the relevant legal
101 instruments promulgated for improving the brick sector in Bangladesh; ii. To find out the local level situation
102 and the implication of national legal instruments in the brick industries of Faridpur Districts.

6 IV. Methodologies

The study has been carried out with a structured methodological process. The scope of the study requires having both the review of the current situation in terms of size of the brick industries, employment, materials produced, legal instrumental development, etc. and the local level information collection, analysis and reporting to draw the linkages between the national and local level scenario.

The study was carried out at Faridpur District located in the central part of Bangladesh. Faridpur is a part of the Dhaka Division and has a population of over 1.7 million and is situated on the banks of the Padma River. The study has been carried out using both primary and secondary data. Secondary data has been used to draw the analysis on sectoral scenario, legislative changes while Key Informant Interviews (KIIs) have been carried out with the relevant stakeholders like, brick kiln owner, representatives of local Brick Manufacturing Owners Association (BMOA), Department of Environment (DoE), local administration etc. to find out the implications of the legislative changes and factor influenced the transformative changes in the brick sector of Faridpur. The data analysis was done to draw a chronological change in the brick sector of the country and how it has affected at the local level to adopt modern kiln technologies and the factors which have facilitated the adoption process.

V.

7 Study Findings

The study findings have been arranged from the national scenario on the brick industries of the country from the legislative process development and the local situation at Faridpur and the role of the national legislative related with the brick industries. The following part is showing the findings of this study:

8 a) Brick Sector related Legislative Development in Bangladesh

From the review on the legal instrumental development process, it is evident that prior to 1989, brick making was an unregulated industry in Bangladesh. In 1989, The Brick Burning (Regulation) Act of 1989 was enacted, and it banned the use of firewood in brick burning with a provision of limited fuel wood burning in the remote areas and also introduced the licensing process for the brick field and soil use guideline for making brick. Later on, a number of amendments of this act have been done by the government and enacted Brick Burning Rules 2002 and issued few notifications on the technology to be used, areas where the brick field to be constructed, and finally the revision of the brick burning act took place in 2011. The following table demonstrates the chronological legal instrumental development process for facilitating and regulating the brick industries in Bangladesh: There is a lack of a government policy to support a long-term brick sector development strategy. As a result, the legal and regulatory framework does not adequately address the relevant energy efficiency guidelines and other underlying development constraints.

9 b) Local Context of Brick Industries in Faridpur

The local level consultation with the brick field stakeholders mainly the owners and the manager has revealed a comparatively good scenario of the transformation of the brick industry in Faridpur. The following table shows the at glance brick sector scenario of the Faridpur District. The above table reveals in Faridpur there are around 113 brick kilns. However, out of 113, 87 kilns are licensed, and the rest 26 are unlicensed FCKs. Among the licensed Kilns around 77 Zigzag kilns are found to be mostly upgraded from the FCKs. Among the Zigzag Kilns, around 50% are improved version zigzag which uses water to settling the particulate matters from the emission while other kilns do not use the water for cleaning the smog. In the district, there are two coalbased Hoffman kilns established recently and still there are 8 licensed FCKs exist although the FCKs are banned. Overall the transformation of the FCK into the improved kiln technology is very promising in Faridpur. Around 68% FCKs has been transformed into the Zigzags after banning the FCK by 2013. And most of the FCK have been upgraded into zigzag before 2013.

10 Higher environmental pollution

While the FCK has been upgraded in the Zigzag then around 6.0 million BDT additional investment required Profit margin is same as the fuel requirement is same Zigzag Comparatively less environmental pollution due to suction and settling effect.

Following the World Bank recommendations, if the upgraded zigzag kilns use the internal fuel then it will further reduce the 20 GHG emissions. The conversion from FCK into the Zigzag required around BDT 6.0 million additional investments. While the fuel consumption and production capacities are same with both the technologies, hence the environmental pollution or the GHG emission is less in the Zigzag kilns.

It is estimated that the 77 nos. of zigzag kilns are yearly producing around 231 million of brick in the district and reducing average 100 tons of GHG to produce per million brick (BBMOA and World Bank, 2011). Therefore, total 23100 tons of GHG emission has been reduced per year by transforming 77 nos. of FCK into the zigzag kilns. The technological transformation was not very difficult. There were few initiatives on the transformation

17 VI. CONCLUSION AND POLICY RECOMMENDATIONS

159 of FCK into Zigzag by the self-interest of the entrepreneurs which actually helped the other entrepreneurs to
160 follow the up-gradation process.

161 **11 Finance**

162 No financial supports were available from the government. The entrepreneurs manage the finance by themselves
163 while the CC loan was available at a higher rate of interest.

164 **12 Government law /policy enforcement for pollution control**

165 Those who have upgraded their brick kiln in zigzag, they did it because of the legal compliance.

166 Because, these entrepreneurs understood, without compliance with the legal process, it is difficult to do the
167 brick business. Therefore, they were interested to comply with the legal process and upgraded their kilns.

168 **13 Role of local DoE**

169 The entrepreneurs opined that the local DoE officials were very much positive and always were sensitizing the brick
170 entrepreneurs about the benefit of upgrading into the new technologies also about the negative environmental
171 consequences of using un-improved technologies. Even the DOE officials were supporting and motivating towards
172 entrepreneurs in any locations of the district.

173 The officials never demanded any extra amount during the license renewal process and sometimes, the officials
174 were pro-actively informing about the renewal process and timeline.

175 **14 Role of local administration**

176 Local district and Upazila administration were very active to start the up-gradation of the industry. The local
177 administration was running frequent mobile court operation to stop the un-improved brick kiln operations in the
178 district and they sometimes put pressure on the entrepreneurs to upgrade the kiln technologies.

179 **15 Education and leadership of the local Brick Manufacturing 180 Owners Association**

181 The local BMOA leaders are comparatively higher educated in Faridpur district and they took the vigilant action
182 by the local administration as one of the disrespectful acts. Additionally, the brick field owners are comparatively
183 the well-off people in the local society. Hence, it became an issue of ego, why to be disrespected by the local
184 administration. The leader has up-graded their kiln first and they also tried to sensitize the other members to
185 upgrade their kiln technology. This process has given a quick result for the kiln up-gradation.

186 **16 Business potential**

187 The owners of the brick fields understand the current level of growth in the brick sector and they know there is
188 lot more demand of brick in the country since there is actual shortage of the building material in the country.

189 Source: Field Survey 2017.

190 **17 VI. Conclusion and Policy Recommendations**

191 Two-thirds of the brick industries have been upgraded till date by converting mostly the FCKs into the Zigzag
192 Kilns. The Brick Field owners lead by local BMOA is in favor of extending time period for conversion of existing
193 FCK to Zigzag beyond 2013. However, the owners require financial assistance from the Bank and other financial
194 institutions with a single digit interest.

195 The local level brick sectoral scenario has been studied only from Faridpur District; therefore, the situation of
196 Faridpur may not be representative for the whole country. Like the transformation process and the facilitation
197 of the adoption of improved brick kiln technologies may not be in same pace in other districts. Further study
198 could focus more districts of Bangladesh for better representation of the country.

199 The following recommendations can take place to improve the sector as well as to attain the energy efficiency
200 and less GHG emission in the country:

201 ? Current financing which is one of the key constraints for low sized kilns managed by family business does
202 not offer any additional benefits to the brick entrepreneurs, therefore, some of the entrepreneurs go bank for
203 the CC loan. If government can arrange a financial facility with a single digit interest rate to these entrepreneurs
204 with a condition of technology up-gradation, then it could help the transformation of the sector at a faster rate;
205 ? Local DoE can set-up a monitoring cell at local level jointly with the local BBMOA leaders to monitor the
206 level of pollution, and other social issues like stop child labor, sharing local knowledge among entrepreneurs,
207 stakeholders, specially fireman, owners, and managers, brick makers for capacity building; ? An incremental
208 emission standard should be deployed to improve the energy efficiency of the brick sector like, combining the
209 internal fuel in the zigzag kiln which could further improve the performance of it; ? Need to set-up R&D cell
210 regionally to research on various issue related with the brick industries and the DoE and the BBMOA can link
211 with the universities. The R&D initiatives can undertake the institutionalized training programme on internal

212 fuel, firing, kiln making, process mechanization etc. issues for the target stakeholders; and ? Coals are sometimes
213 not available and lowstandard coal is being imported from the neighboring countries which need to be dealt
properly. ¹

Figure 1:

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Year	Regulation	Responsible Agency	Details	Remarks
1989	The Brick Burning (Regulation) Act of 1989	DOE, MOEF	(MOEF) introduced licensing for brick kilns. Bangladesh's first brick-making law banned the use of firewood for brick manufacturing and	Use of firewood has largely been discontinued, but in r
	Revision of		The 1989 act was amended to regulate the location of brick kilns.	Using the given criteria, it is nearly impossible in reality to find land for brick
2001	the Brick Burning (Regulation) Act of 1989	DOE, MOEF	The new provision required that brick kilns not be set up within 3 kilometers of the upazilla (district	kilns in Bangladesh. The Bangladesh Brick Manufacturing Owners Association often cites this as
			center),municipal areas, residential areas, gardens, and government reserve forests.	Despite this amendment, the location requirements have not been enforced.
			The government introduced a rule that made the use of 120 feet (36.6 meters) chimneys for brick kilns compulsory.	This requirement enforced, especially in the vicinity of urban areas, and most bull's trench kilns were upgraded to fixed chimney kiln technology. However,
2003	Brick burning Rules	DOE, MOEF		some bull's trench kilns continue to operate, albeit illegally.

Figure 2: Table 4 . 1 :

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2: At a glance brick field scenario in

Faridpur District

Type of Brick Field

Unlicensed FCK

Licensed FCK

Zigzag

Hoffman (coal based)

Total

No. of Brick Field

26

8

77

2

113

Source: Local BBMOA
and DoE.

Figure 3: Table 4 .

4

Technologies Capacity

FCK

Capacity of the brick production is
same in both the
kilns.

Key Issues Environ-
mental pollution

Investment Profit

Figure 4: Table 4 .

4

Factors

Technological availability

Overall responses of the brick field own-
ers/managers

Figure 5: Table 4 .

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