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

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Abstract

Brick industry is one of the largest informal industrial sectors in Bangladesh contributes to 1% of GDP. Brick industry is expanding due to expansion of the real estate sector while compromising several environmental and social consequences. To modernize the industry and managing the environmental pollution, government amended the Brick Burning Act 1989 and issued number of orders following by enacting the Brick Manufacturing and Establishment of Brick Kilns (Control) Act 2013. The current study focuses the implication of regulatory changes at Faridpur District level and also identified the factors like, 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. which are influencing the adoption of government regulations so that the industry have been studied. Also recommendations from local level derived to faster the transformation following the government regulations.

Keywords: *Brick Kilns, Environmental Pollution, Urbanization, Legislative Process.*

1 Introduction

Brick industries identified as one of 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 (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 & Khaliquzzaman, 2013). Brick making subsidize 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 recognised as industry (Word Bank, 2011).

In Bangladesh, brick filed 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 comparable cost. The country's overwhelming dependence on bricks is due to its lack of stones in any sizable quantity or other alternative building materials at comparable cost (World Bank, 2011). To attain the target of sustainable growth in the country and attaining the efficiency 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).

In order to protect the environment, the government of Bangladesh is trying to compress down the brick industries through regulations and encouraging the use of cleaner technologies. There is 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. However, the existing legislation is based on the Brick Burning Act (1989) and various amendments and circulars thereafter. Though in place, these legal frameworks have not been effective to encourage brickfield owners to switch to the most efficient technologies and reduce pollution. The most concrete step taken by the government is the 2010 government notification that banned the operation of FCKs by September 2013 (ADB, 2012). Due to the still-developing economy, businesses often choose cheap, though inefficient, operational techniques to reduce costs. Most brickfields are informal, small to medium-sized businesses6 that operate with outmoded technologies, are severely polluting, and have poor labor standards. Thus the country's inability to develop an energy efficient, clean and modern brick sector is a sign of market failure, and is a result of general lacks of (i) awareness of available modern technologies, (ii) technological and operational capacity, and (iii) targeted finance.

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

2 Methodologies

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 the primary data collection process like the Key Informant Interview (KII) has been conducted to find out the implications of the legislative changes and influencing factor for such changes. KII has been carried out with the local brick field owners, and government department like Department of Environment, local administration representatives.

3 Study Findings

The study carried out at Faridpur District which is located in the central part of the Bangladesh. Faridpur is 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 findings have been arranged from 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:

3.1 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 has been enacted and it ban the use of firewood in brick burning with a provision of limited fuel wood burning in the remote areas and also introduced 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 filed to be constructed and finally the revision of the brick burning act took place in 2011. The following table shows the chronological legal instrumental development process for facilitating and regulating the brick industries in Bangladesh:

Table 1. Summary of the legislations of brick burning in Bangladesh

Year	Regulation	Responsible Agency	Details	Remarks
1989	The Brick Burning (Regulation) Act of 1989	Department of Environment (DOE), Ministry of Environment and Forests (MOEF)	Bangladesh's first brick-making law banned the use of firewood for brick manufacturing and introduced licensing for brick kilns.	Use of firewood has largely been discontinued but in remote areas it continues on a limited scale.

2001	Revision of the Brick Burning (Regulation) Act of 1989	DOE, MOEF	The 1989 act was amended to regulate the location of brick kilns. The new provision required that brick kilns not be set up within 3 kilometers of the upazilla (district center), municipal areas, residential areas, gardens, and government reserve forests.	Using the given criteria, it is nearly impossible in reality to find land for brick kilns in Bangladesh. The Bangladesh Brick Manufacturing Owners Association often cites this as a major deficiency in the law. Despite this amendment, the location requirements have not been enforced.
2002	Brick burning Rules	DOE, MOEF	The government introduced a rule that made the use of 120 feet (36.6 meter) chimneys for brick kilns compulsory.	This requirement was successfully enforced, especially in the vicinity of urban areas, and most bull's trench kilns were upgraded to fixed chimney kiln technology. However, some bull's trench kilns continue to operate, albeit illegally.
2007	Government Of Bangladesh notification	DOE, MOEF	The government issued notification that environmental clearance certificates would not be renewed if an owner did not shift to alternative fuel and improved technologies by 2010.	This regulation has not been implemented since little on-the-ground activity occurred to facilitate the switch.
2010	Government of Bangladesh notification	DOE, MOEF	A new notification was issued banning fixed chimney kiln operation from 2013.	Activities are being undertaken under the government's Clean Air and Sustainable Environment Project with World Bank support
2013	Brick Manufacturing and Establishment of Brick Kilns (Control) Act 2013	DOE, MOEF	The revision of the act has the objective to regulate the brick industry establishment, licensing, efficient fuel use, soil use, location of brick field etc.	Brick field technologies were not mentioned.

Source: ADB, 2015.

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.

3.2 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 glace brick sector scenario of the Faridpur District.

Table 2. At a glance brick field in Faridpur Distract

Type of Brick Field	No. of Brick Field
Unlicensed FCK	26
Licensed FCK	8
Zigzag	77
Hoffman (coal based)	2
Total	113

Source: Local BBMOA and DoE.

The above table revels in Faridpur there are around 113 brick kiln exist. However, out of 113, 87 kilns are licensed and rest 26 are unlicensed FCK. In the licensed Kiln there are around 77 Zigzag kilns found which are most upgraded from the FCK. Among the Zigzag Kilns, around 50% are improved version zigzag which use

water to settling the particulate maters from the emission while other kilns don't use the water for cleaning the smog. In the district there are two coal based Hoffman kilns established recently and still there are 8 licensed FCK exist although the FCK are banned. Overall the transformation of the FCK into the improved kiln technology is very promising in Faridpur. Around 68% FCK has been transformed into the Zigzag after banning the FCK by 2013. And most of the FCK have been upgraded into zigzag before 2013.

Table 3. Understanding about the technologies by the entrepreneurs

Technologies	**Key Issues**			
	Capacity	**Environmental pollution**	**Investment**	**Profit**
FCK	Capacity of the brick production is same in both the kilns.	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.		

Source: Field Survey 2016.

The conversion from FCK into the Zigzag required around BDT 6.0 million additional investment. While the fuel consumption and production capacities are same with the both the technologies and hence the environmental pollution or the GHG emission is less in the Zigzag kilns. It is estimated that the 77 nos. of zigzag kin are yearly producing around 231 million of brick in the district and reducing average 100 tons of GHG to produce per million brick. Therefore total 23100 tons of GHG emission has been reduced by transforming 77 nos. of FCK into the zigzag kilns.

Table 4. Factors influenced the brick making technology upgradation

Factors	**Overall responses of the brick field owners/managers**
Technological availability	The technological transformation was not very difficult. There were few initiatives on the transformation of FCK into Zigzag by the self-interest of the entrepreneurs which actually helped the other entrepreneurs to follow the up-gradation process.
Finance	No financial supports were available from the government. The entrepreneurs manage the finance by themselves while the CC loan was available with a higher rate of interest.
Government law /policy enforcement for pollution control	Those who have upgraded their brick kiln in zigzag, they did it many because of the legal compliance. Because, these entrepreneurs understood, without compliance the legal process, it is difficult to do the brick business. Therefore they were interested to comply with the legal process and upgraded their kilns.
Role of local DoE	The entrepreneurs opined that the local DoE official were very much positive and always were sensitizing the brick entrepreneurs about the benefit of upgrading into the new technologies also about the negative environmental consequences of using un-improved technologies. Even the DOE official were supporting and motivation any entrepreneurs in any locations of the district. The officials were never demanded any extra amount during the license renewal process and sometimes, the officials were pro-actively informed about the renewal process and timeline.
Role of local administration	Local district and upzila administration were very active to start the up-gradation of the industry. The local administration were running frequent mobile court operation to stop the un-improved brick kiln operation in the district and they sometime put pressure on the entrepreneurs to upgrade the kiln technologies.
Education and leadership of the local Brick Manufacturing Owners Association	The local BMOA leaders are comparatively higher educated in Faridpur district and they took the vigilant action by the local administration as one of the disrespectful act. Additionally the brick field owners are comparatively the well-off people in the local society. So it became an issue of ego, why to be disrespected by the local administration. The leader has up-graded their kiln first and they also tried to sensitized the other members to upgrade their kiln technology. This has given a quick result for the kiln up-gradation.
Business potential	The owners of the brick fields understand the current level of growth in the brick sector and they know there is lot more demand of brick in the country since there is actuate shortage of the building material in the country.

4 Conclusion and Way Forward

Two thirds of the brick industries have been up-graded till date by converting mostly the FCKs into the Zigzak Kilns. The Brick Field owners lead by local BBMOA are in favor extending time for conversion of existing FCK to Zigzag beyond 2013 however, the owners require financial assistance form the Bank and other financial institutions with a single digit interest. Following the World Bank recommendations, if the upgraded zigzag kilns use the internal fuel then it will further reduce the 20 GHG emissions. Along with these World Bank recommendations, the following recommendations can take place to improve the sector as well as to attain the energy efficiency and less GHG emission in the country:

- Current financing which is one of the key constraints for low sized kilns managed by family business do not offer any additional benefits to the brick entrepreneurs, therefore some of the entrepreneurs go bank for the CC loan. If government can arrange a finical facility with a single digit interest rate to these entrepreneurs with a condition of technology up-gradation, then it could help the transformation of the sector at a faster rate;
- Local DoE can set-up a monitoring cell at local level jointly with the local BBMOA leaders to monitor the level of pollution, and other social issues like stop child labor, sharing local knowledge among entrepreneurs, stakeholders, specially fireman, owners, and managers, brick makers for capacity building;
- An incremental emission standard should be deployed to improve the energy efficiency of the brick sector like, combining the internal fuel in the zigzag kiln which could further improve the performance of it;
- Need to set-up R&D cell regionally to research on various issue related with the brick industries and the DoE and the BBMOA can link with the universities. The R&D initiatives can undertake institutionalize training programme on internal fuel, firing, kiln making, process mechanization etc. issues for the target stakeholders; and
- Coals are sometimes not available and low-standard coal is being imported from the neighboring countries which need to be dealt properly.

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