

Trends in Punitive Actions against Environmental Pollution in Bangladesh

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Abstract

This study aims to understand the prevailing status of fines levied for environmental pollution in Bangladesh and how the fines are distributed across different violation types and industrial sectors. Historical records of punitive actions by the DoE for the period 2010-2018 were analyzed. It was found that textile and fabric industries constituted the maximum share of violations (47% of all non-compliance instances) which received an average fine of 15,686USD. The total amount fined to textile and fabric industries is 67% of all fines levied, indicating that this sector is the primary contributor to environmental pollution. The predominant violation type was the discharge of untreated effluent with a defective ETP (17% instances), having received an average fine of 12,261USD, whereas discharging untreated effluent keeping ETP non-functional had the maximum fine amount (Avg. fine 21,617USD). Pollution to water resources received the maximum attention of all environmental compartments (54% of industries, 67% of all fines levied). The variation of fines within similar violation or industry categories was large, indicating an arbitrariness in imposed fines. Repeated offenses were treated similarly to first-time offenses implying that the strategy of fines may not be deterrent enough to commit a violation. DoE should review its mechanism of punitive measures for the regulation of pollution activities and effective environmental management.

Introduction

Maintaining sustained economic growth led by industrialization, Bangladesh aspires to become an upper-middle-income country soon. The rapid industrial growth and urbanization have had an adverse environmental impact that is increasingly harming the prospect of overall economic growth and healthy living (World Bank, 2018). According to the Environmental Performance Index 2020, the position of Bangladesh is 162 out of 180 countries, indicating the alarming condition of the environment (Bashar and Fung, 2020). The Department of Environment (DoE) is the regulatory authority in Bangladesh that is mandated to protect the environment according to the Environmental Conservation Act 1995 (ECA 1995). Among many measures, DoE levies a fine against the polluting factories by applying the Polluters Pay Principle (PPP). The Environment Conservation Rules 1997 (ECR 1997) and several legal instruments specify a rate of compensation based on several criteria (category of industry, land area of the factory and others). Since the enactment of ECA 1995, DoE has been conducting enforcement activities for over two decades, and it is high time to review these activities to assess their effectiveness in protecting the environment from pollution. In this study, the record of fines during the period 2010 – 2018 was collected from the DoE and analyzed for spatial and temporal trends, types of violations, and violators. Though the main objective was to explore significant trends of punitive actions over this period, the viability of the current fine structure and capacity of DoE to safeguard the environment with its current institutional set-up is also assessed.

Methodology

Although the DoE has been conducting enforcement activities since 1995, a systematic record of fines is available since 2010. 2800 counts of fines were found during 2010-2018, of which 178 counts were discarded due to incomplete information. The remaining 2622 fine records were categorized by types of violators (factories, projects) and their locations, types of violations, types of pollution (air, water etc.). SPSS, a standard statistical software package, was used to organize and analyze the data. Standard descriptive statistics (mean, median, percentiles and quartiles) were used to characterize the data. It was found that there are 24 types of violators (textile, pharmaceuticals, paper mills, brick kilns and so on) who were charged with one or more of the 34 types of violations. t-tests were used to assess the differences in fines between different groups (sectors, type of violation etc.). Analysis of means and variances were carried out to determine the disparities in levied fines for more than two groups. Fines in Bangladesh Taka (BDT) were converted to US Dollar (USD) based on the conversion rate: 1 USD = 85 BDT.

Results and Discussion

Sectoral and geographic distribution of pollution fines

The descriptive statistics of fines for major factory categories are presented in Table-1. It is noted that the fine ranges from 6 USD to 354297 USD, the maximum fine being 59000 times the minimum fine. There is a large standard deviation in fines, which indicates that the fines could have been arbitrarily imposed in most instances. Textile and fabrics, real estate, construction and land development, brick kiln and have more violations than other types of entities (Fig-1). Textile and fabrics factories have the maximum fine counts (1234 out of 2622) with 19.4 million USD collected from this sector alone during 2010-2018. This amounts to 67% of the total fines collected. In Bangladesh, most enforcement activities have taken place in the Dhaka division (2083 counts, 79% of total fines during 2010-2018) because of the high density of industries in this division. Chattogram division has the 2nd highest counts of fines; however, it is almost 1/10th of the total counts of fines in the Dhaka division. Textile and fabric factories in Bangladesh have been rapidly growing in the last few decades. Figure 1 also shows the box-plot of fines for textile and non-textile factories. It was seen that although the textile sector was fined more than any other entities and have more outliers (the standard deviation of fines is two times that of non-textile factories), the average fine of the textile sector was higher than that of the non-textile industries/entities. Welch's two-sample t-test confirmed this. It contradicts with the earlier findings of Haque (2017), which found that the mean fines of the textile and non-textile sectors were equal. This indicates that the textile and fabric factories, which have the maximum contribution towards pollution in Bangladesh, have been preferentially targeted in enforcement activities by the DoE. However, the large variance of fines within the sector indicates that there is arbitrariness in fines imposed, which might affect the efficacy of the enforcement.

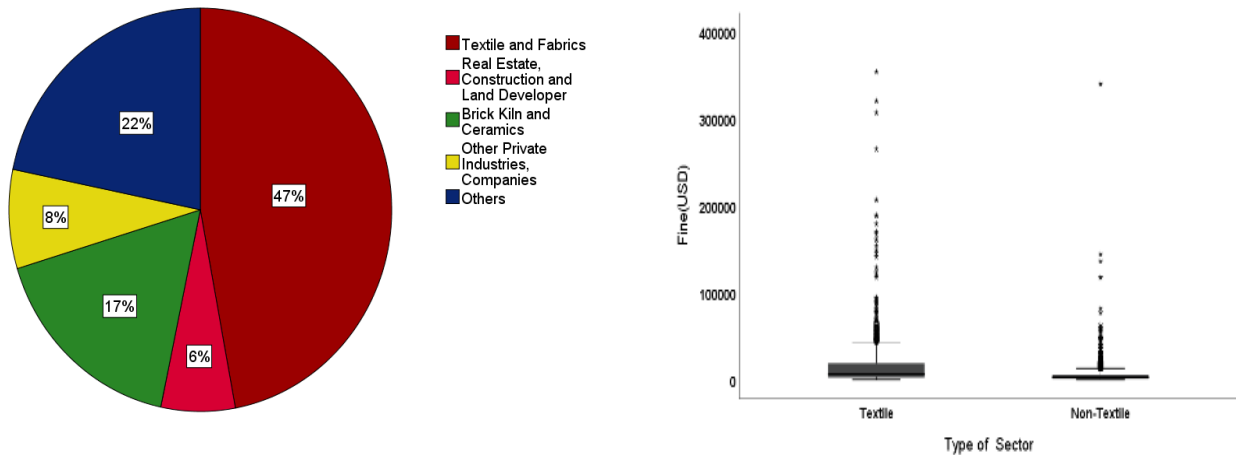


Figure 1: Proportion of fine counts in different industrial sectors during 2010-2018(left) and box-plot of average fines for textile and non-textile sector (*right*)

Table-1: Descriptive statistics of fines from different industries during the period 2010-2018

Type of Factory	Fine Count	Mean (USD)	Median (USD)	Sum (USD)	Minimum (USD)	Maximum (USD)	Std. Deviation (USD)
Textile and Fabrics	1234	15686	5902	19356510	13	354297	28344
Paper printing Mill	97	16361	9428	1587027	87	136487	19365
Pharmaceuticals	34	4987	1007	169548	6	59018	11005
Real Estate, Construction and Land Developer	164	10972	3742	1799468	295	340368	29233
Brick Kiln and Ceramics	445	4310	3541	1917763	177	118036	6565

Type of Factory	Fine Count	Mean (USD)	Median (USD)	Sum (USD)	Minimum (USD)	Maximum (USD)	Std. Deviation (USD)
Other Private Industries, Companies	208	4837	2361	1006017	55	118036	9733

The Trend of Fines for Different Types of Violation

It is found that violations contributing to water pollution were the primary focus of enforcement activities (54% of total counts and 67% of all fines levied), and Textile and Fabric factories were mostly responsible for this. The major types of violations found in industries were the absence of Effluent Treatment Plant (ETP), non-functional or defective ETP, industries operating without environmental permits or a combination of these (Figure 2). The predominant violation type was the discharge of untreated effluent with a defective ETP (17% instances), having received an average fine of 12,261USD, whereas discharging untreated effluent keeping ETP non-functional had the maximum fine amount (Avg. fine 21,617USD). All these resulted in the discharge of untreated effluent to natural water bodies. The reasons for non-compliance of many of these factories are technical; the ETP could be poorly designed, resulting in high operation and maintenance costs. However, it is also true that some of the factory owners have adopted an opportunistic approach. The factories know when the inspection would take place (usually twice or thrice a year). They know that even they are fined an average of 1,000,000 BDT twice each year, it would still be more economical to pay the fine rather than running a wastewater treatment plant (Sakamoto et al., 2019). Also, they know that if they appeal to the court, sometimes the court can be sympathetic and reduce their fines. The loopholes in the environmental regulation system have allowed them to operate in this manner (World Bank, 2018). It is also noted that, for the same type of violation, different factories are fined differently. Figure 2 (right) shows that operating a defective ETP, textile and paper factories are fined significantly higher than pharmaceuticals and food-beverage factories. This again points towards the arbitrariness in imposing fines by the regulatory agency.

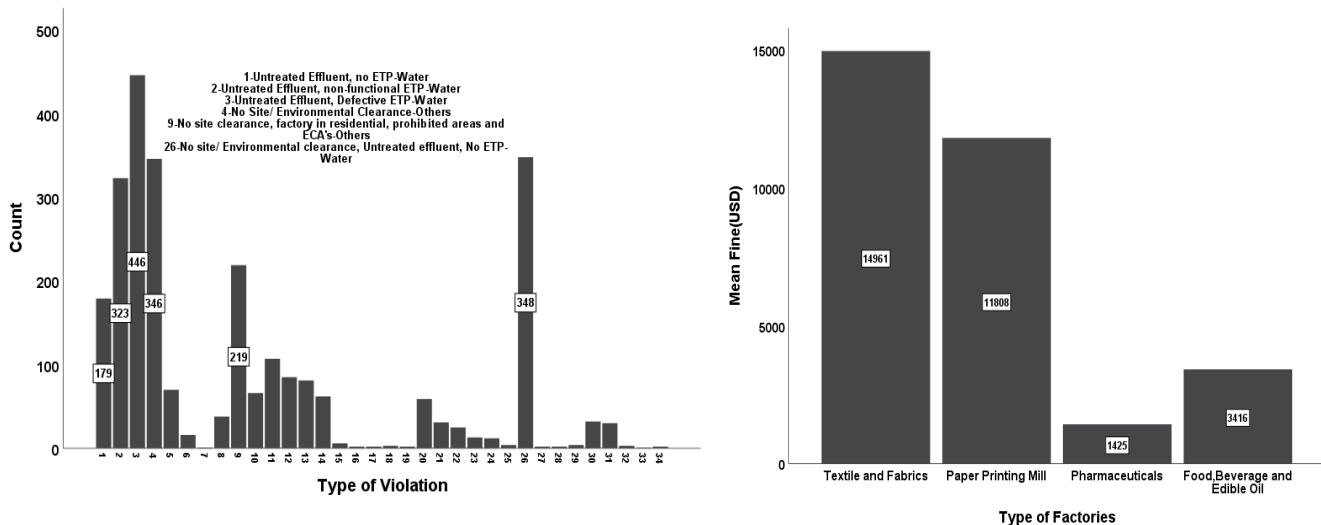


Figure 2: (left) Fine counts against Type of Violation and (right) average fines levied on different industrial sectors for violation type 3 (untreated effluent, defective effluent treatment plant)

Temporal Trends and Repeat Offenders

The trend of levying fines over this period shows that the fine counts were high in 2011, 2012, and 2014 but lower in the later years (figure 3). With the increasing number of industries over the years and the tendency of industries to violate the rules, it is expected that the enforcement activities would also increase. A relatively constant trend of fine counts after 2014 may indicate limited manpower of DoE conducting enforcement activities. It has been previously analyzed that DoE's approved headcount is significantly lower than that of environmental agencies of

comparatively sized middle-income countries (World Bank, 2018). DoE's current organogram shows a separate monitoring and enforcement division at the directorate (central) level, but there is no distinction or separation of roles at the local level. This might pose limitations in conducting enforcement activities in local or remote areas. It is possible that with the current manpower, the enforcement activities may have reached a limit, and additional manpower is required to increase vigilance over polluting industries.

Strict monitoring and effective enforcement generate should generate deterrence which improves the compliance status of the polluting factories and prevents the repetition of violations. The presence of Repeat Offenders indicates the failure to achieve deterrence among the polluters. Over the period 2010 - 2018, 201 factories were repeating the violation for the 2nd time, and 32 factories were found repeating for the 3rd time. Statistical significance tests show no difference in mean fines among the 1st, 2nd and 3rd instances of violation for the offenders (Fig 3 (*right*)). Imposing progressively higher fines for repeat offenders is a common strategy to achieve compliance (Gray et al., 2011). However, in this case, the data shows that repeated offenders are treated similarly as their first offense, which is unlikely to yield favorable results regarding compliance.

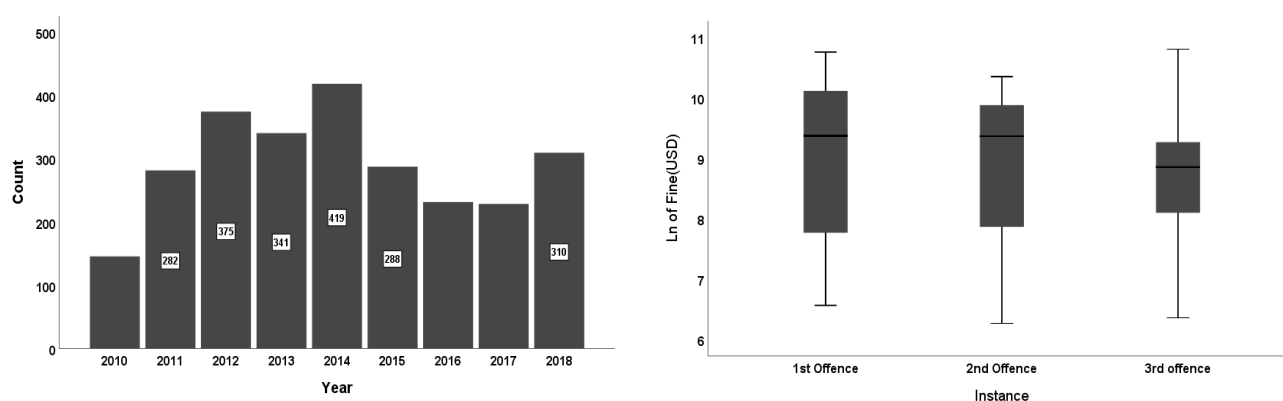


Figure 3: Time series of fine counts during 2010-2018 (*left*) and box-plot of fines for 1st, 2nd, and 3rd-time offenders (*right*).

Conclusions and Recommendations

The enforcement regime of the DoE of Bangladesh could be portrayed by analyzing the current and historical trend of pollution fines. Bangladesh currently ranks 98 among 113 countries in the enforcement regime, and it is not as strict as in some other countries in Asia (World Bank, 2018). The vigilance and monitoring of DoE should be significantly enhanced to improve this scenario. In addition to the increase of manpower, DoE may adopt innovative means of monitoring and enforcement to deter polluting activities. Often the reasons for the enforcement failure are the absence of a structured method in damage quantification and subsequent environmental compensation and insufficient resources (knowledge, human resources, and funds), which leads to imposing arbitrary fines. The fine collection efficiency has also been poor (~48%, according to World Bank 2018 report), which might encourage the polluters to seek legal loopholes in the system. The policy framework and enforcement regime need to be strengthened to effectively address mounting environmental degradation and pollution in Bangladesh. In this regard, repeated violators must be penalized at progressively higher rates, and the fine structure should be revised so that it causes maximum deterrence. The DoE also needs to maintain a proper database for recording inspections and enforcement measures so that it is easier to track the compliance status of industries.

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