

# Governance Challenges of the Department of Environment and Way Forward

**Executive Summary** 

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#### Governance Challenges of the Department of Environment and Way Forward

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# Governance Challenges of the Department<sup>1</sup> of Environment and Way Forward

# **Executive Summary<sup>2</sup>**

#### 1. Background and Rationale of the Research

According to the United Nations Environment Program, about 12.6 million people die each year worldwide due to environmental disasters, which is a quarter of the total global mortality. According to the Environmental Performance Index (EPI) (2020), Bangladesh is one of the countries lagging behind to prevent environmental pollution and ranked 162<sup>nd</sup> among 180 countries. Based on the annual average presence of various air pollutants, Bangladesh is also ranked number one in the world. Dhaka ranks second in the list of polluted capitals (IQAir, 2020). An average of 31,300 people dies each year in Bangladesh due to air pollution (HEI, 2020). According to 'Bangladesh Environmental Survey-2017', Bangladesh loses 2.7% of its gross domestic product (GDP) each year due to environmental pollution. In addition, 200 tons of wastewater per ton cloth is discharged from garment factories. Major sources of air pollution in Bangladesh are brick kilns (38%), transportation (19%) and road dust (18%).

As part of its principle, Article 18-A of the Constitution of Bangladesh declares to protect the environment and biodiversity. The Department of Environment (DoE) serves as the key institution of the Government of Bangladesh (GoB) in achieving environment-related Sustainable Development Goals (SDGs), including environmental development, pollution control, and tackling climate change. It is also the focal point of the GoB in implementing relevant national and international agreements, including environmental laws.

However, several reports have been published in electronic and print media with allegations of irregularities and corruptions of the DoE, including non-compliance with laws, policies, and regulations and failure to implement pollution control activities. Previous research of TIB (2015) identified deficits of governance in Environmental Impact Assessment (EIA) and management of Ecologically Critical Areas (ECA). However, there is a need for comprehensive research on good governance in the activities of the DoE. Therefore, this research has been conducted to observe and analyze the efficiency and effectiveness of DoE, carrying out its mandates and fulfilling responsibilities to protect the environment and prevent pollution.

#### 2. Objectives of the Research

The main objective of this study is to identify the governance challenges in the DoE. The specific objectives of this study are to -

- Identify the limitations and challenges to comply with the law of the DoE;
- Identify the institutional limitations and challenges of the DoE;
- Identify the types, levels and causes of irregularities and corruption in the activities of the DoE; and
- Formulate recommendations to overcome the challenges of good governance of the DoE.

<sup>&</sup>lt;sup>1</sup> The word 'Department' is used against the Bengali word of 'Odhidaptar'. The Bengali name of the organization is 'Poribesh Odhidaptar', followed by the name as 'Department of Environment' in official correspondence.

<sup>&</sup>lt;sup>2</sup> This summary (translated in English) of the study report titled, "Governance Challenges in Department of Environment and Way Forward" was released on 5 January 2022.

#### 3. Methodology of the Research

Mixed methods have been followed in conducting this study. Data has been collected, verified and analyzed using both qualitative and quantitative tools and techniques. Necessary research-related data has been collected from both primary and secondary sources. The timeline of the study was from April 2019 to December 2021.

Table 1: Types of data, sources and methods of collection

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Data Type		Data Collection Method	Source of Data					
Primary Data	Qualitative	Key Informant Interview (30) Observation (7)	Officials of the DoE; concerned ministries; organizations receiving environmental clearance; Project Implementation Officer; Environmental Impact Assessment (EIA) consultants; and environment experts  Pollution control activities; national and local level offices					
	Quantitative Survey (353)		Organizations receiving environmental clearance					
Secondary Data		Analysis and review	Relevant laws, rules and policies; relevant research reports, news reports published in the media; reports published by the DoE; relevant public-private reports and websites					

**Sampling:** A two-stage stratified sampling procedure has been followed to select environmental clearance recipient industrial units. In the first phase, two divisions (Dhaka metropolitan and Chittagong metropolitan) out of nine that issue environmental clearance were selected following random sampling method. In the second phase, industrial units have been selected from each industrial category<sup>3</sup> of each selected divisions in a systematic random sampling method. In both the divisions there was one green class industrial unit, which have been selected in the survey. Data have been collected from 353 industrial units using survey questionnaires. The green category has been analyzed separately, as there are not enough samples or comparative analysis.

**Table 2: Sampling of Environmental Clearance Recipient Survey** 

Categories of Industrial Unit	Dhaka Metro	Chattogram Metro	Total surveyed industrial units	Percent
Green	1	1	2*	0.57
Orange-A	52	10	62	17.56
Orange-B	102	61	163	46.18
Red	95	31	126	35.69
Total	250	103	353	100

#### 4. Analytical framework of the study

The findings of the study have been analyzed based on six indicators of governance. Indicators and sub-indicators of governance are given in Table 3.

Table 3: Indicators and sub-indicators of governance

<sup>&</sup>lt;sup>3</sup> For explanation of the categories please see Appendix.

Indicator	<b>Sub-indicator</b>					
Rule of Law	Challenges and deficits to comply with existing laws, policies and					
Rule of Law	regulations to protect the environment					
	Manpower and Human Resource Management, Physical					
Capacity	Infrastructure, Logistics and Technology-based Management and					
	Financial Management					
	Proactive disclosure of information, Information disclosure system,					
Transparency	On-demand dissemination of information, website and updating					
	information and information management					
Accountability Monitoring of activities, audit and complaint management						
Participation	Citizens participation in DoE activities; Community and stakeholders'					
1 articipation	participation in the public hearings and social audit of DoE					
	Identification of environment risks; Recovery measures,					
Performance	compensation imposed and collection; prosecution of environmental					
	cases					
Coordination	Coordination among government and non-government organizations					
Corruption and	Soons type level and feators of compution					
irregularities	Scope, type, level, and factors of corruption					

#### 5. Research Findings

### 5.1. Environmental Laws, Policies and Rules: Challenges in Compliance

Bangladesh Environment Conservation Act, 1995: Section 3 (2) of the Act describes the appointment of a Director General for the DoE. However, there is scope of irregularities in the recruitment process, as the terms and conditions of employment, such as specialized knowledge and experience related to environment are not determined for the appoint of the Director General. In addition, Section 5 describes the management of ecologically critical areas, but there is no instruction regarding demarcation of such areas. Due to the lack of jurisdiction over the demarcation of such areas, construction of environmentally harmful coal and LNG power plants and heavy industrial plants continue near the ecologically critical areas. Although polythene shopping bags are prohibited under Section 6 (a), single-use plastics and laminated plastics are not prohibited. There is no instrument to prevent the use of polythene. As a result, uncontrolled use of single-use plastic continues to be a major cause of contamination.

Environmental Court Act, 2010: There is a provision to establish one or more environmental courts in each district of Bangladesh under this act [Section 4 (1)]. However, at present there are only three environmental courts and one environmental appeal court in the whole country. In the absence of sufficient courts, delays in the trial of relevant cases increased causing the suffering of the complainants and defendants. Permission has to be sought to file a case in the Special Magistrate Court after completing the lengthy administrative and bureaucratic process through the Director General of the DoE [Section 6 (1)]. The common people cannot file such cases. Only the Director General or an officer designated by him can file such case directly in the Special Magistrate Court. Moreover, unless the written report of the inspector of the DoE, no compensation claims can be accepted for trial by the Environmental Court [Section 6 (4)]. Thus obstacles are created for the victim to file a lawsuit directly and get compensation.

Brick Manufacturing and Brick Kilns Establishment (Control) Act, 2013: Section 5 of the Brick Making and Kiln Establishment (Control) Act, 2013 mentions croplands as 'agricultural land' where crops are produced twice or more a year to prohibit use of its soil for making bricks. As a result, the top soil of single-crop land is used to make bricks, and the fertility of the land is diminishing. In addition, although the use of firewood for burning bricks in brick kilns is prohibited [Section 6], wood is being used instead of coal. Section 3 (a) states that a brick field cannot be set up within one kilometer of a residential area, educational institution,

market and cropland. However, the brickfields are still built by occupying croplands adjacent to the locality. In 2019, the law was amended and section 5 (3a) was added. Later, a circular was issued making it mandatory to use block bricks as an alternative for all government construction, repair and renovation in order to gradually reduce the use of soil. However, block bricks in the private construction sectors has not been made mandatory. As a result, use of top soil continues for making bricks, and the government target of reducing soil use is at risk.

Environmental Conservation Rules, 1997: Public and private projects and industries are not allowed to discharge more than the prescribed amount of waste into the environment (Rule 13). However, in some cases, the level has not been determined in line with the internationally followed standards. As a result, more than the prescribed amount of waste is being discharged from various projects and industries, and soil, water, and air become polluted with toxic waste. Rule 7(2) prohibits setting up industrial units in residential areas. However, environmental clearance certificates are issued in residential areas violating the rule. It paves the way of misusing government assets (water, electricity, gas) and creates noise, and water and air pollution. It also increases the risk of accidents, including building collapse and fire. In order to get environmental clearance certificates, all types of industrial units must have a no-objection letter from the local authority [Rule 7 (6)]. However, DoE issues environmental clearance certificates in favor of industries without such no-objection letter.

#### 5.2. Capacity

**Human Resource:** There is an acute manpower crisis in the DoE. Although the number of approved posts in the Department is 1,141, there are only 475 staff (vacancy rate 59.25%). Environmental clearance and other services cannot be ensured on equal basis due to shortage of manpower, which creates opportunities for irregularities and corruption. The quality of work decreases as an officer/employee is assigned to multiple tasks simultaneously. The Department does not have its own expert team to review the monitoring reports. Due to the lack of manpower with relevant environmental and technical knowledge and expertise, environmental disasters and polluting sources cannot be detected quickly. High level officials on deputation also lack experience and specialized knowledge on environment and climate. Moreover, the high officials of DoE, being deputed from government administration, also cannot take objective position on different projects (in case of environmental clearance for mega projects and industrial plants that are hazardous to the environment) of the government.

Table 4: Summary of human resources in the DoE

Rank	Approved Manpower	Vacancy		
	(number)	(number)		
1st Class	274	94		
2 <sup>nd</sup> Class	201	166		
3 <sup>rd</sup> Class	428	210		
4 <sup>th</sup> Class	238	206		
Total	1,141	676		

Infrastructure and Logistics: The DoE has offices in only 21 districts. The absence of offices in all the districts of Bangladesh hampers the effective implementation of the vision and mission of the organization. Some offices have to conduct activities in 3-4 districts simultaneously. Field level offices have a shortage of necessary infrastructure (e.g. office rooms, seating arrangement, and furniture). These offices also lack necessary logistical facilities, such as computers, printers, photocopiers and broadband internet connections. Although the environmental clearance certificate application process has been made online, the issuance and renewal has not been digitalized. Modern technology is not used in environmental

protection and pollution control activities, including supervision and monitoring. In addition, Geographical Information Systems (GIS) and remote sensing technology have not been incorporated in the department's activities. Due to manual operation, the DoE is unable to accurately identify the level of pollution.

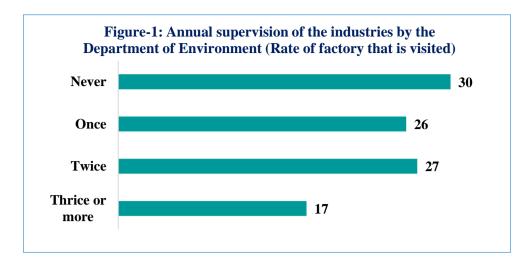
**Financial Management:** The DoE cannot spend the budget allocated for controlling pollution although this is one of the most important activities of the Department. The average allocation for the DoE in the last five fiscal years was BDT 98.38 crore, while the average yearly expenditure was BDT 85 crore (86.40% of the allocation). The Department collects an average of BDT 65.11 crore as revenue every year by generating fines, penalty and seizure, issuance and renewal of environmental clearance certificate and other fees, including examination and testing fees. The ministry rejected a proposal to allocate some of the money raised through fines, punishments, and forfeiture for improving manpower, organizational structure, and institutional development of the DoE. However, DoE is more interested in revenue collection than environmental protection and pollution control, which creates obstacles in protecting the environment and risks of corruption. On the other hand, although the issuance of environmental clearance certificate and collection of renewal fees is one of the main sources of income of the Department, they have not been able to bring a significant number of industries under its surveillance.

#### 5.3. Transparency

There are various shortcomings in the DoE in terms of openness of information and pro-active disclosure of information. The full budget and project details are not given on the website of the Department. The DoE does not disclose the data on pollution, where pollution occurs and the polluters. The field-level offices do not have their own website and the local-level activities of the Department are not known as the citizen charter is not being displayed. The annual reports of the last two years have not been published on the website. The central website is not updated regularly and the documentary of the DoE has not been updated in the last six years. The Environmental Impact Assessment (EIA) reports of different projects, including megaprojects of the country (such as Rampal, Matarbari, Padma Bridge etc.) are also not published on the website.

#### 5.4. Accountability

**Supervision of activities:** The DoE has to monitor ETP, factory environment, water quality, license papers, laboratory report, money receipt, renewal of clearance certificate and original certificate etc. intensively during the supervision of industries. About one-third of the surveyed industries were not monitored by the DoE once a year. In addition, due to lack of supervision by senior officials, issuing and renewal of environmental clearance certificates are delayed. In some cases, the representatives of the industries are harassed by the brokers while trying to get the clearance certificate with their help. Sometimes, the effluent of industrial plants does not meet the set standard, and there are allegations that the monitoring report does not reflect the true condition.



**Audit:** The Office of the Comptroller and Auditor General (CAG) conducts routine audits of the Department but appropriate action is not taken on the basis of its observations. On the other hand, the internal audit of the Department is not survey-based but only document review-based.

Grievance Redress System: Although there are irregularities in various activities of the DoE, people have disbelief/suspicion in the grievance redress system and they show reluctance to lodge complaints. There is no complaint box in the offices for receiving written complaints; in some cases, the complaints lodged by the industries and the complaints published in the media have failed to be investigated and addressed. Though the department sends notices to the polluters due to the complaints of the common people, the companies get exemption by signing bonds. If a written complaint is made against the

Box 1: "Technical and environmental knowledge is essential for auditing the Department of Environment, but those who conduct the audit lack knowledge about it. The audit report does not include the steps taken to control pollution, the rate of pollution, the amount of fines as well as seizure, and the polluters. The Environmental Performance Audit (EPA) conducted in 2007 found that there was a lack of specialized manpower for environmental protection."

(Source: Comments of a key informant)

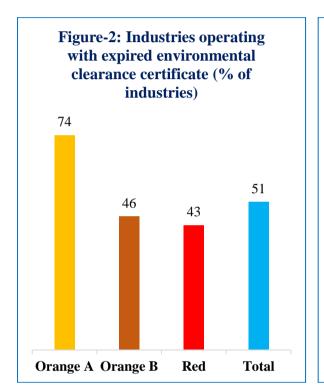
officials of the Department, there is deficit of administrative investigation. If an interdepartmental complaint is lodged, the problem is resolved through the concerned ministry or department, but in some cases there is a risk of harassment of the complainant.

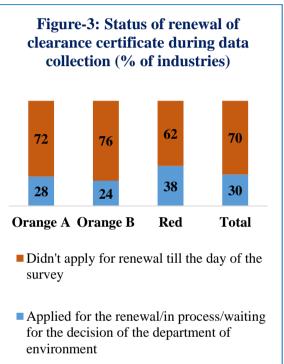
**Involvement of stakeholders:** Public hearings are held at the headquarters of the DoE on the third Thursday of every month. However, it is not effective as expected. If an allegation brought in the public hearing is not resolved, the same allegation has to be lodged again in writing to the Director General. Feedback from the local community are not sought before starting any project and conducting EIA. Environmental surveys (IEE, EIA and SIA) on environmental hazards and degradation in certain cases do not reflect the views of local people. The DoE neither involves the local population in its advocacy programs, nor it has any plan to involve stakeholders in environmental management.

#### 5.5. Performance

**Identifying institutions and environment at risk and recovering:** The quality of water coming out of ETP is not properly assessed. Sample is collected quicker than the standard time. Therefore, accurate information about effluent discharge does not come in the report and the polluting industries cannot be identified. There is a rule to cancel a project if the risk of a project is not likely to be mitigated even with the 'Mitigation Measure' plan after conducting the EIA. This rule is not applied in large government projects and large industries. Heavy industries and

factories, including coal-based power plants, continue to be set up near the environmentally critical areas. The DoE did not take any effective measure to protect the environmentally critical area of Sundarbans and the Irabati dolphin sanctuary that are 4 km and 2.5 km away respectively from the Rampal Power Plant. According to the UNESCO observation and the Ramsar Convention, the EIA report of the Rampal Coal-fired Power Plant project was found to be faulty and harmful for the ecology and ecosystem of the Sundarbans. It was alleged that the EIA report was changed from time to time. The DoE initially objected to the project but did not take an objective and firm position afterwards. The project is being implemented despite objections from environmentalists. On the contrary, although Dhaka City is at the top level in the list of polluted capitals, the Department has failed to take effective measures to stop air pollution.





**Expired environmental clearance certificate (ECC):** Fifty-one percent (51%) of the surveyed industries are operating with expired ECCs. Of them 70% have not applied for renewal till the time of data collection.

**Determination and collection of compensation and case management:** The DoE does not have any list of polluting industries. As such, there is no accurate figure or estimates on fines, penalties, and confiscations to ensure the 'polluters pay' principle. During 2017-18 to 2020-21, only BDT 70.77 crore of compensation has been collected through fines, penalties and confiscation, which is negligible compared to the amount of environmental damage caused by pollution in Bangladesh in the last four years. On the other hand, through appealing polluting industries are exempted from a large amount of the imposed fines. The total number of cases in the mobile court is 8,756. There are allegations that the Department is more interested in collecting fines through mobile courts instead of filing lawsuits in environmental courts against the polluters. Apart from the cases filed under the Environmental Protection Act, a large number of criminal lawsuits are filed in the environmental courts. The total number of cases in the three environmental courts of the country from 2015 to 2020 is 7,002, of which the number of cases filed under the Environmental Protection Act is only 388, which is 5 percent of the total cases. In addition, there is a shortage of timely submission of investigation report and presentation of witnesses by the Department in the environmental court. Moreover, there are

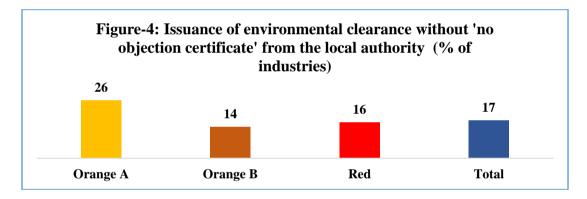
allegations that to keep the opportunity for earning more for certain lawyers the required number of lawyers are not hired to handle the cases. There are also delay in disposal of cases.

#### 5.6. Coordination

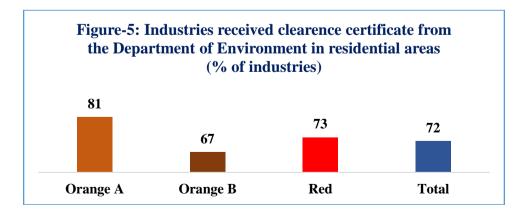
Due to lack of proper coordination, there is a lack of supervision to ensure proper implementation of the guidelines mentioned in the Environmental Management Plan (EMP) of various projects and industries. Due to the lack of coordination, there is also a lack of effectiveness of ETP and preparation of objective reports on waste emissions as per standards and guidelines. The Department has to rely on other departments for administrative and law enforcing powers to run mobile court. The administration and law enforcing agencies do not have the time and opportunity in the pollution control activities and mobile courts of the DoE. Although a committee has been formed centrally to coordinate with the DoE and other government agencies, there is also a lack of effectiveness due to the busy schedule of its members.

#### 5.7. Corruption and irregularities

Issuance of ECC without 'no objection certificate' (NOC) from the local authority: For getting the ECC from the DoE, all industrial units must submit 'no objection certificate' obtained from the local authority. However, 17% of the industries included in the survey received clearance from the DoE despite not getting 'no objection certificate' from the local authorities.

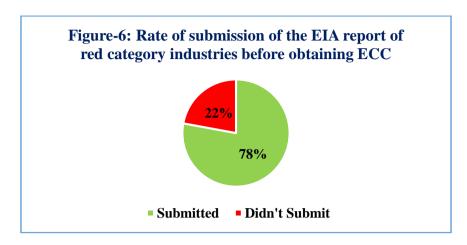


**Industrial units located in residential areas:** Although there is a legal provision not to set up factories in residential areas, most of the industries covered in the survey (82%) are located in residential areas who have obtained ECC. There are allegations of abuse of power, and in some cases, collusion and illegal money transactions.

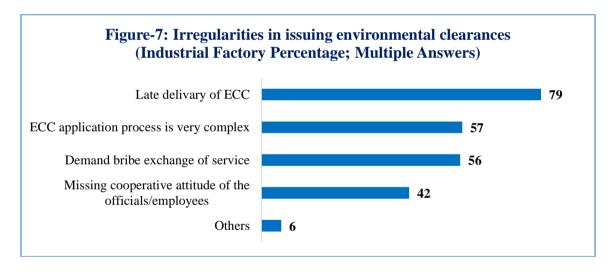


**EIA** report by the red category industry: There are allegations that the polluting industries are operating using faulty EIAs through influence and collusion by vested interested groups, including bureaucrats, politicians of ruling party who have their own interests. In some cases,

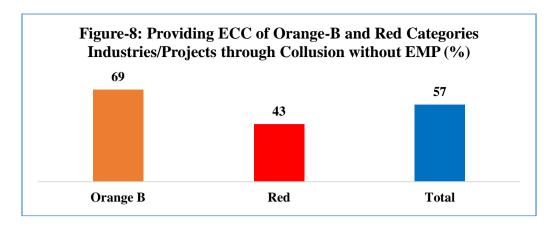
the EIA is done in near completion phase of the project. In some instances the EIA is done at the end phase of project implementation which is termed as 'Extension EIA'. It is mandatory for red category industrial units to submit EIA report before obtaining ECC. However, according to the survey, 22% industries did not submit EIA report.



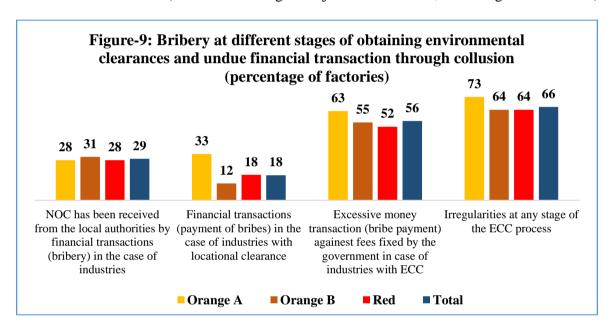
**Irregularities in issuing ECC:** There are allegations of collusion between middlemen and some officials for granting environmental clearance upon receipt of a portion of the illegal money. According to the survey, 51% of the factories alleged of irregularities in receiving environmental clearances. The irregularities include late delivery of ECC, complex ECC application procedure and demanding of bribes in getting ECC.



**Issuance of ECC without Environmental Management Plan (EMP):** It is mandatory to submit EMP at the time of applying for environmental clearance for Orange B and Red category industrial units. However, 56% of the industries included in the survey received environmental clearance without any EMP.



Illegal financial transactions at different levels of issuing ECC: About 66% of the surveyed industries made illegal financial transactions through collusion at various stages of obtaining environmental clearance (such as obtaining no objection certificate, obtaining site clearance).



In case of receiving an ECC, the illegal financial transactions has been estimated at ranging from a minimum BDT 36,000 to a maximum of BDT 1,08,800 within the surveyed industrial units of different categories.

Table 5: Average amount of undue financial transactions through collusion at various stages of obtaining environmental clearance

Types of industries	obtaining no-objection	Undue financial transactions in case of receiving site clearance (Average in BDT)	Undue financial transactions for obtaining environmental clearance certificate (Average in BDT)	Overall undue financial Transactions (Average in BDT)	
Orange A	6,400	92,000	10,500	43,000	
Orange B	9,500	86,000	44,000	36,000	
Red	8,000	1,25,800	166,000	1,08,800	

<sup>\*</sup> The amount of illegal financial transactions is represented as the weighted average of the whole number.

Other irregularities and corruption: There are allegations of irregularities in the project named 'Clean Air and Sustainable Environment'. Under this project, a total of 293 officers

have taken foreign travel in the name of training in last 10 years and one officer has taken 10 foreign trips. Besides, the Parliamentary Standing Committee expressed concern over irregularities in the process of implementation, and sent the Implementation, Monitoring and Evaluation Division (IMED) under the Ministry of Planning for evaluation of the project. There are also allegations that some of the employees of the DoE waived the fines of polluter industrial factories through abuse of power and illegal transactions. During monitoring the effectiveness of ETP in a factory, through collusion of some employees of the Department and illegal money transactions, it keeps the ETP inactive/closed and is not penalized. Threats from influential people, interference and verbal instructions from high levels of government are among the obstacles to the normal functioning of the DoE.

#### 6. Overall Observation

On one hand there are weakness of environmental laws, while the DoE has failed to effectively implement the existing laws, rules, and regulations on the other. Corruption has been institutionalized in the DoE as a result of irregularities and corruption of a large number of employees and lack of effective measures to prevent corruption. The effectiveness of the DoE has been hampered as a result of the association of a part of the employees of the department with the part of the owners of the polluting industries and the lack of effective measures to prevent it. There are deficiencies in different indicators of good governance in the activities of the department - such as ensuring transparency, establishing accountability, public participation and effective coordination. The DoE has failed to protect the environment due to the lack of capacity as well as its inability of taking an objective position in case of the government decision. The establishment of various large-scale government-run development projects and industrial plants, including coal-based power plants, is largely responsible for environmental pollution. Although environmental protection and pollution control should be one of the priority areas of the DoE, it has failed to exercise its power. Due to the dependency on bureaucracy, lack of use of modern technology, lack of audit, lack of professional skills and in many cases lack of honesty, courage and determination, the DoE has become a weak, corrupt and largely inefficient and ineffective institution.

#### 7. Recommendations

- 1. For proper enforcement of the law, large development projects and industrial plants responsible for environmental pollution must be held accountable, beyond fear, pressure and financial temptation.
- 2. It is necessary to appoint persons with specialized knowledge and experience at the top level of the Department instead of appointing on deputation.
- 3. Necessary financial allocation, adequate infrastructure, technical and logistical facilities must be ensured for all the offices by determining proper needs.
- 4. The website needs to be more informative (such as audit report, full budget, full details of projects, full information on fines and collections made to various industry organizations, EIA reports of all projects, etc.) and regularly updated.
- 5. Accurate EIA must be ensured through following proper guideline of the DoE and listing the environmental consulting firms. Moreover, the consulting firms must be brought under the accountability mechanism of the Department.
- 6. Statements of annual income and assets of all staff involved in project implementation, pollution control and environmental protection must be disclosed to the higher authorities at the end of the year and made open for the public.
- 7. People involved in ECC related irregularities, corruption and violation of organizational discipline must be given proper punishment.
- 8. Effective utilization of ETP and environmental audit including the enhancement of mitigation plan and EMP supervision as per EIA report must be ensured.

- 9. Strict monitoring and evaluating pollution control and environmental protection activities by the expansion of the latest technology and its effective use must be ensured.
- 10. The law should be amended so that the common people can have the opportunity to file cases directly in the environmental court.

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## **Appendix:**

Industrial units / institutions / projects are divided into the following four categories according to the impact on the environment and location. 'Green' class industries / institutions / projects cause very little damage to the environment; 'Orange-A' has a detrimental effect on the environment; environmental risks are higher in the case of 'Orange-B'; and in the case of the 'Red' category, risks are the most and they have dangerous effects on the environment.

Table 6: Brief explanation of categories based on industrial units/projects

Categories		Essential functions in obtaining environmental clearance certificate									
of the industries	Not to set up industrial factories in residential areas	Feasibility study	Initial environm ental examinati on (IEE)	Waste disposal system	Establish ment of effluent treatment plant (ETP)	Environm ental manage- ment plan (EMP)	objection certificate	pollution reduction	Rehabili tation plan	Impact	Site clearance
Green	$\sqrt{}$	X	X	X	X	X	$\sqrt{}$	X	X	X	X
Orange A	V	X	X	V	X	X	V	X		X	V
Orange B	$\sqrt{}$		$\sqrt{}$	<b>√</b>	$\sqrt{}$		$\sqrt{}$	$\sqrt{}$		X	$\sqrt{}$
Red		$\sqrt{}$		$\sqrt{}$	$\sqrt{}$	$\sqrt{}$	$\sqrt{}$			$\sqrt{}$	$\sqrt{}$