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Industrialization and Human Health in Howrah – An Economic Analysis

Dr. Niladri De
(Department Of Economics, Narasinha Dutt College, Howrah, India)

Abstract: Since the introduction of industrial and technological changes, economic indicators have been considered as the important criteria for measuring progress and economic development. The industrialization has been accompanied by a growing negative impact on the environment in terms of its pollution and degradation. Economic activities such as manufacturing, processing, transportation and consumption not only deplete the stock of natural resources but also add harmful effects on the environmental system by accumulating the stock of wastes which worsen the human health. Untreated waste becomes pollution, increasing not only private costs but also social costs. Degradation of environment often imposes negative externality on the economy resulting in output and human losses, loss of labour productivity from ill- health and loss of crop output.

For our study we have selected Howrah Industrial zone and we have collected the secondary data from different sources and also collected primary data by sample survey. For sample collection we have taken 3 industries which are grossly polluting the environment and these are a) Foundry Industry b) Chemical Industry and c) Engineering Industry. Not only that we have taken those industries because their numbers have increased during last few decades. We have taken respondents from each category. Among the respondents some are industrial workers both salary earners and wage earners reside in Howrah region, industrial workers reside outside Howrah region and non industrial worker i.e the residential person. We also have interviewed a few doctors for our purpose.

In Howrah different industries such as iron foundries, hot rolling mills, metal finishing units, a number of thermal power plants etc. have been put on environmental compliance after the introduction of pollution control legislation and as a result there has been a downswing in the economic and environmental condition of the town because of backdated and old technologies. In Howrah industrial zone workers have been suffering from different health problems and they are forced to maintain the medical expenses to maintain their jobs in the site. So the locations of such units and workers health safety requirements need a serious review.

Key Words: Occupational Disease, Small Scale Industry, Government Policy, Human Health.
Jel Classification: Q58, I18, O14.

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I. Introduction

In the Small Scale Industries (SSI) in developing countries a higher number of occupational diseases and work related health problems in industries have been reported. Traditionally, Howrah has been regarded as an industrial area in the economy of West Bengal. With reference to the interview, "Bad environment makes the poor susceptible to diseases" (Down to Earth, Vol.8, No.18; Feb 15, 2000), Howrah has been referred to as a "Town inhibited by railway porters and this needs to be corrected. It also has mentioned that Howrah has suffered historical neglect, in comparison to Calcutta, the City across the river Hooghly. Being an Industrial town with a large migrant worker population, Howrah was viewed as a "Coolie town". Here the term "Coolie" means labourer rather than railway porters.

In Howrah several industries established during the British rule such as iron foundries, hot rolling mills, metal finishing units, a number of thermal power plants etc. As most of these industries were built long before the environmental concern came to the forefront, they generate various forms of emissions in large quantities because of their outdated technology and absence of pollution abatement measures. After the introduction of pollution control legislation, most of these industries have been put on environmental compliance. Recently some attention has been given to the Small Scale Industries (SSI) and it is expected that they would also be able to comply with emission norms. In the Howrah industrial zone workers have been suffering from different health problems due to the backdated technology and due to the less safety measurements in the moulding operation in the foundry industry. Even in this zone workers are not getting proper wages and their medical expenses are very high. They are forced to maintain the medical expenses to

maintain their jobs in the said industry. So the locations of such units and workers health safety requirements need a serious review. In this article we analyze different kinds of human health hazards related to industrial occupation in the Howrah industrial zone and accordingly will prescribe policies to improve the situation.

Objective

The specific objectives of the study are-

i) To understand the human health impact due to industrial effluents in Howrah industrial zone.
(ii) To develop a policy framework to promote environment friendly industrialization.

II. Literature Review

The need for rapid industrialization has compelled to resort to destruction of the natural resources involving indiscriminate burning up of petrochemicals (transportation exhaust fumes through industrial as well as residential activities). This has led to hazardous after effects. Two thousand industries in about 1,04,000 sq.km. around Taj Mahal release tons of sulphur di oxide and other noxious gases which the experts have confirmed to be dangerous to Taj Mahal's existence and also hampering the human health. In a survey of Bangalore city, 130 out of 197 water samples analyzed have been found to be contaminated and this is due to the release of industrial effluents and creating different health problems. These activities cripple the environment and hamper the various economic activities (Melodena and Deepashri, 1996).

The continuous expansions of mega cities are now gradually bringing in industrial units which were established initially outside the city zones, within their periphery, thus adding another dimension to the environmental problem of the inhabitants. It has been estimated that more than 3900 cities and towns with a population of more than one lakh are experiencing the stress of air pollution (Sundaresan and Ravi, 1991).

It is viewed that it is difficult to maintain the SPM level at ≤ 150 mg/nm^3 independently either by dry system or wet system in the foundry industry in Howrah. A technology combining appropriately these two systems may tackle these problems; but it then would be relatively costly. Moreover, the expected level of differences between controlling devices and production technologies could not be found, which presumably reflects perhaps the lack of awareness among the owners about the technologies suitable for their respective units and their inefficiency in operating the system. Inability in reducing SPM level according to the prescribed norm seems to be due to the inefficiency in operating the system. This might lead the owners to make a negative attitude towards modernization. It may be necessary for the owners to go deeper into this problem of failure to comply with the requirement and adapt ways of improving it.

At the same time, it should be stated that some improvements in the technologies are required for the achievements of the prescribed norms. Besides, the awareness about the merits and demerits and the level of technical efficiency of these available technologies may help the owners to adopt one which would be appropriate for the given size for operating the units profitably after incurring this additional investment (Chakroborty, Chakroborty, Mukherjee and Maiti).

The potential environmental impact of the leather industry is widely acknowledged. In addition to the traditional problems of air and water pollution, there are other concerns like chemical safety, contamination of land and ground water, inadequate provision for solid waste and sludge disposal, and spills and accidents involving chemical substances. In one state, Tamilnadu, workers suffered from skin disorders because of poor safety measures (Jha, Markandya, Vossenaar, 1999).

What is urgently needed is a 'total system' approach to modern civilization through pooled talents of scientists and engineers, in cooperation with social scientists and the medical profession, can be focused on the development of order and equilibrium in the presently disparate segments of the human environment. Most of the skills and tools that have created such manifold environmental problems are capable of solving them. This is necessary if we can develop and apply new preventive technologies to benefit man both now and in future generations without transferring an environmental catastrophe from one resource (air, water, land) to another. Individual's ingenuity and investigation will not be silent by such practicability, but will be challenged and stimulated to always consider new developments and alternatives (Das, 1990)

Industrialization and ongoing development of large urban areas in many countries are posing increasing number of people to potential hazards of air pollution. There are reports of adverse effects of carbon monoxide, sulphur dioxide, nitrogen dioxide, ozone, and particulate matter with aerodynamic diameter less than 10 micrometer (PM10) on hospital admissions for cardiovascular and respiratory diseases as well as daily mortality. On the other hand, the effects of the ambient air pollution due to industrialization on general population causing minor complaints not resulting in medical consultations is not properly investigated particularly in developing countries (Yunesian, Asghari, Vash, Forouzanfar, Farhud, 2008).

In India, with a large quantification of hazardous industrial wastes, more rigorous environmental regulations to control them, a focus on developing technologies to minimize such wastes, and above all an alert

monitoring of the safeguards adopted by the polluting industries are urgently needed to counteract this menace in a more effective manner. Turning to specific areas suffering from industrial pollution, we note that this dilemma of development is being focused by the industrially advanced provinces of India. Thus in Ankleswar in Gujarat, the air, the chemical industrial estates are almost unfit to breathe. Continuous washing of printed cloth in the river water in Rajkot as polluted it to an extreme degree. In West Bengal fly-ash from the thermal power plant in Bandel is hazardous to public health.

Brundtland report emphasizes that, 'at a minimum, sustainable development must not endanger the natural systems that support life on earth: the atmosphere, the waters, the soils and the living beings'. In the industrialization process the third world, including India, hardly paid any effective attention to such ideas before the United Nations expressed concern about environmental protection (Sen, 1995).

Pollution prevention in the industrial sector is not a new concept. Industrial operations traditionally have adopted a variety of waste reduction techniques to lower costs of production to increase profits. However, only in recent years, economical incentives and the corresponding emphasis on prevention as a management priority have grown more rapidly. Industrialists pursued waste reduction as long as it was profitable (Lal, 1992).

III. Industrial Profile in Howrah

The District of Howrah has become important with the opening of railways from Howrah In 1854. The district is covered under Presidency Division and occupies 9th position in the state in respect of its size with an area of 1467 sq.km. The District of Howrah though smallest in area is remarkably known as "Industrially Developed" district in the state having a unique position in industrial economy. The position is unique because of the existence of both industry and residence in the same area/location. There is a large industrial population in the district. The industrial heritage of the district is enviable and it plays a vital role in the economy of both the state and the country as a whole.

Table No 1: Industry at a glance

Sl. No.	Head	Unit	Particulars
1	Registered Industrial Unit	No.	3049
2	Total Industrial Unit	No.	-
3	Registered Medium & Large Unit	No.	-
4	Estimated Avg. No. Of Daily Worker Employed In Small Scale Industries	No.	11235
5	Employment In Large And Medium Industries	No.	165426
6	No. Of Industrial Area	No.	11
7	Turnover Of Small Scale Industries	In Lacs	215,66,8328934
8	Turnover Of Medium & Large Scale Industries	In Lacs	-

Source: - District Statistical Handbook of BAES & Economic Review, 2011-12, Govt. of West Bengal

It has been noticed that number of industrial area was 6 in 2006-07 and as per the Table-1 the figure increased to 11, which clearly shows the industrial development in the Howrah industrial zone.

III.I. Growth Trend

To understand the growth trend we are mentioning here the number of industrial projects that have been implemented in the Howrah district during 2008, 2009 and 2010 and we have also mentioned the amount of investment in different industrial projects during 2008-2010.

Table No 2: Industrial projects implemented in the district of Howrah

Year	No. Of Units	Investment (In Cr.)
2008	24	99.91
2009	52	469.00
2010	72	491.50

Source: Economic Review, 2011-12, West Bengal

Table-2 shows a gradual increase in terms of number of industrial units in the district of Howrah during 2008-2010. So, in this context the district of Howrah is one step ahead of other industrially developed districts of West Bengal.

IV. Occupational Human Health Disease

Any economic activities related to processing of materials in industries can cause health problems for the workers unless adequate care is taken to protect them from contamination with solid wastes, effluent and emissions. Long term exposure to hazardous substances and excessive heat, light noise etc. can cause considerable damage to the health of industrial workers. Industrial diseases are also contracted through the entry of various toxic substances into the body (chemicals dusts, fuels, or gases). The ingestion of these substances can be through lungs, skin or month. They can cause direct poisoning (as lead and mercury does); an allergic response (as industrial dermatitis), sterility, abortion or congenital abnormality (as in the case with radiation), or specific diseases such as lung, skin and bladder cancer. Dust can be a cause of serious illness or even death from lung disease.

These are all recognised as industrial diseases if the victims are known to have been exposed to particular substances. Increasingly, such occupational exposures to chemicals represent a key health and environmental problems. Thus, the varieties of possible health hazards are growing all the time. Such hazards are not confined to chemical factories alone. Detergents and bleaches for example, used by laundries, can also pose a threat to human health. Among the industries and allied activities in West Bengal posing substantial health hazards including death are jute, cotton, textiles, paper, tanneries, electroplating & galvanising, offset printing, paints, chemicals & rubber, batteries, pesticides, fireworks, welding, synthetic fibres, pharmaceuticals, x-rays, dry-cleaning, blast furnace, rolling mills, foundries etc.

IV.I. Scenario from Howrah

Different Industries In Howrah have been developed in the last three decades and all those industries came up to supply intermediate inputs to industries of shipbuilding, jute, textiles, railways, trams etc. those set up at Calcutta – Howrah region in the colonial period (Government of India, 1958).

The small sector is closely related to the organised industrial sector as consumer of processed industrial goods as well as fabricators of components of assembled intermediate goods. Such assembly functions are generally carried out in the organised sector. It is important to note the nature of inter-dependence between the two sectors. Apart from such dependence, the small scale sector units are producing poor goods for the proper sections of the society by selling those through informal sector traders. In Howrah one of the major concern for environment is linked with the functioning of small scale industries, many of which continue to operate without regulation. Small acid manufacturing units, metal processing unit, alone crusher phase relying units, lead battery recycling units, chemical industries, foundry industries etc. are some examples, which contribute significantly towards, environmental degradation. The locations of such units and workers health safety requirements need a serious review. No detailed surveys on environmental status of these units are available although nearly 100,000 people are working in such enterprises.

In this context we must mention that foundry units in Howrah are the major concern for the economy. Most of the foundry owners in Howrah were local residents, who started their factories entirely with their own resources. There were owners also from neighbouring districts of Calcutta and 24 Parganas and some from other provinces such as Uttar Pradesh and East Punjab. Most of the workers belonged to same caste and were fairly well controlled by their employers who were the caste leaders. In this industry owners are not maintaining proper precautionary measures and that is why workers are suffering from different health problems inside the industry. Even in this industry gloves and masks are not supplied adequately which are very much required for moulding operation. It is also pertinent to mention here that labour productivity in Howrah foundries is 2.7 times higher than that in average DME[1] units of West Bengal and 117 per cent higher than that of DMEs in India. But all these labourers mainly unskilled labourers are not getting the minimum scheduled wages (Table-3) and they are unable to maintain their medical expenditure when they are suffering from different health hazards in the

[1] DME, i.e., Directory Manufacturing Enterprise is an enterprise which employs six or more workers (NSSO, 1998).

work place. Howrah's desperate situation has so far gone largely undocumented, apart from sensationalist accounts of Third World deprivation such as Dominique La Pierre's best-selling novel *The City Of Joy*. In general, the description of this urban drama must therefore remain more impressionistic than supported by toxicological and other scientific data. Anybody visiting the city for the first time will be appalled by stagnant water in open drains even along major streets. Heaps of garbage are piled up just above anywhere. Tiny, light deprived workshops operate wall to wall with residential houses on one side and slum hutments on the other.
However, development in Howrah appears to have stopped in its tracks. The living conditions of the vast majority of people are obviously still very similar to what Friedrich Engels described in his assessment of working class quarters in England in the 19th century. Indeed, the dismal appearance of Howrah is by no means a new phenomenon.

Table No 3: Average monthly income of workers at Howrah according to occupational grade

Occupational Grade	Average Monthly Income (In Rs.)
Headmould Maker	3000
Moulder Maker	2000
Charger	1500
Furnace Man	1800
Nail Man	1250
Night Lifter	1250

Source: Roy (2008)

V. Methodology

The study is confined to environmentally polluting industry clusters in Howrah. Initially, we chose 1) Foundry Industry 2) Chemical Industry and 3) Engineering Industry. Not only that we have taken those industries because their numbers have increased during last few decades. We have taken respondents from each category. Among the respondents some are industrial workers both salary earners and wage earners residing in Howrah region, industrial workers residing outside Howrah region and non industrial workers i.e the residential person. We also have interviewed a few doctors for our purpose.

To ascertain the feasibility of data collection and to gain familiarity with the industries chosen for the study, we visited Bally, Liluah, Ghusuri and Bandhaghat. This enabled us to gather preliminary information about the origin and nature of industries, number of foundry industry, chemical industry, hot rolling mills and their functioning.
Secondly we use secondary data collected from various sources and will be used for better analysis.

The sources of secondary data are:
1. State Government Reports including those of West Bengal Pollution Control Board.
2. NSS data or any other primary sources.
3. MOEF (Ministry of Environment and Forest)
4. Central Pollution Control Board (CPCB)
5. WBPCB Report.

For our analysis we have applied statistical techniques like z statistic $\chi 2$ statistic, correlation coefficient.

VI. Analysis and Discussion

We selected the Bally Municipality and Howrah Municipal Corporation because of the high concentration of industries in these two regions. On the basis of the collected data we have constructed the following table and analysing the data we have formulated our result.

Table No 4: Distribution of industrial workers residing in Howrah industrial area

Year of Service (A)	No of worker	Average family member	% of people suffering from chronic asthma
$A \leq 10$	31	4	42.22
$11 \leq A \leq 20$	37	5	65.78
$A>20$	32	6	76.47

Source: Author's Calculation

For Table-4 we assume the Null Hypothesis that 'the proportion of people suffering from chronic asthma or breathing problem or from any other chronic disease is 50%, i.e 50/100 = 0.5'.
So H_0 (P = 0.5).

Here we are interested to see if the proportion of people suffering from chronic asthma is more than 50%; i.e Alternative Hypothesis is H_1 (P > 0.5).
Applying z statistic we get,
z for first group = -1.06, z for 2nd group = 2.53 and z for 3rd group = 4.14.
So, we conclude that industrial workers in Howrah region have been suffering from the chronic diseases created from the industrial dust or anything else inside the industry.

Table No 5: Distribution of industrial workers not residing in Howrah industrial area

Year of Service (A)	No of Worker	Average family member	% of people suffering from chronic asthma
A ⩽ 10	22	5	27.02
11 ⩽ A ⩽ 20	16	6	61.53
A >20	14	4	30
Total	52	5	39.51

Source: Author's Calculation

For Table-5, we assume the Null Hypothesis is that 'the proportion of people suffering from chronic asthma or breathing problem or from any other chronic disease is 50%, i.e 50/100 = 0.5'.
So H_0 (P = 0.5)
Here we are interested to see if the proportion of people suffering from chronic asthma is more than 50%; i.e Alternative Hypothesis is H_1 (P > 0.5).
For our analysis we apply the z statistic (since the total sample size is greater than 30).

Applying z-statistic we get the calculated value of z = - 1.64 and we can accept the null hypothesis and we conclude that proportion of industrial worker who are coming from outside Howrah suffering from chronic asthma is 50% or less than 50%. From the proportional analysis it has been found that the workers who live outside Howrah region have been suffering less than those of the Howrah region. Another important proposition that follows in this context is that the level of education of the workers living outside Howrah region is much better than those living in this region itself. Besides they are, environmentally, more conscious than their counterparts of the Howrah region. Moreover, the workers living in Howrah region get totally exploited by the industrialists themselves. At the same time, these workers are forced to do their job just to maintain their family.

Table No 6: Distribution of income and medical expenditure of industrial workers in Howrah

Income (In Rs)	Medical Expense (Medical Expense forced to be made for maintaining job at the site)
1000-2000	300
2000-3000	250
3000-4000	200
4000-5000	250
5000-6000	150
6000-7000	150
7000-8000	100
8000-9000	100
9000-10000	50

Source: Author's Calculation

At a glance Table- 6 may apparently be surprising in the sense that with more income there is a less medical expense. However, if we minutely observe the table we notice that people having low income suffered from various diseases and to get rid of these diseases they are compel to spend more on medical ground. On the other hand the people with relatively higher income are conscious about their health and they suffer less and consequently their medical expenses are also less.

From Table-6 we have calculated simple correlation coefficient between the income level and medical expense and we notice that the value of correlation coefficient (r) is -0.95. So we can say that the relationship between the income level and medical expense is negative and we can say the people earning less money have to pay more for their medical expense because they are directly related to the furnace or any other direct industrial work and they are basically the wage earners.

Table No 7: Level of education and distribution of income

Educational Level	Monthly Income			
	High Middle	Low Middle	Poor	Total
Illiterate	5	24	23	52
Literate	58	103	27	188
Total	63	127	50	240

Source: Author's Calculation

Table No 8: Correlation Coefficient, Z-Test and $\chi 2$-Test results (For Table- 4, 6 and 7)

Serial No.	Particulars	Results
1	Correlation coefficient between the income level and medical expense	-0.95, highly negative.
2	t-Test result for testing Correlation coefficient between the income and medical expense	$t_{(cal,7,0.05)} = 8.10$ $t_{(tab,7,0.05)} = 2.37$ $H_0 : r = 0$ $H_1 : r \neq 0$ H_1 is accepted.
3	Z-Test results for testing health conditions of industrial worker residing in Howrah	$z_{(tab,\ 0.05)} = 1.96$ $z_{(cal,\ 0.05)} = -1.06$ (1^{st} group) $z_{(cal,\ 0.05)} = 2.53$ (2^{nd} group) $z_{(cal,\ 0.05)} = 4.14$ (3^{rd} group) H_0 is rejected H_1 is accepted
4	$\chi 2$-Test result between level of Education and Economic Condition	$\chi 2_{\ (cal,\ 2,\ 0.05)} = 24.99$ $\chi 2_{\ (tab,\ 2,\ 0.05)} = 5.99$ H_0: Educational level and Economic condition are not related H_1: Educational level and Economic condition are related. H_1 is accepted

Source: Author's Calculation

From Table-7 we are interested to test whether the two attributes, Level of Education and Economic condition are related or not. The necessary null hypothesis H_0: the two attributes are independent. The appropriate test statistic is the Chi-Square Test for independence of attributes. From Table-7 we get that the calculated value of Chi-Square is 24.99 which is much higher than the tabulated value at 2 degrees of freedom (5.99 at 5% and 9.21 at 1%) and we conclude that the two attributes are associated.

Table-8 clearly depicts the picture that correlation coefficient between income level and medical expenses is significant. So it is clear that people with low income have to maintain high medical expense to maintain job at the site. We've also got the information that lower income group people are mainly involved with the direct machinery works in the factory and they are suffering most. Finally some important observations are as follows:

a. The industrial workers mainly the wage earners are suffering most because they are directly engaged with the production operation.

b. The industrial workers are not getting proper precautionary measures like dress, masks, gloves or any others from the owners.

c. The industrial workers residing in Howrah are suffering most from the disease like chronic asthma, cold, cough, breathing problem, skin disease etc. One reason may be that they are not able to shift themselves from Howrah industrial area and they are taking their breath from that environment always.

d. The environment of the Howrah industrial area is very poor to breathe and sometimes the workers of outside Howrah took leave for their health purpose and again joined in a fresh health.

e. The industrial workers with less income have to maintain more medical expenses for maintaining job at the site.

f. As the owners are not aware about the technical efficiency of different controlling technologies, they could not mention the specific reasons of ill health of the industrial worker.

VII. Conclusion

Industrialization is the second largest segment of Indian economy in terms of employment as well as exports. Their sustained economic performance is imperative for India's economic development. In this connection the SSI Units of Howrah (Foundry and Chemical) has a considerable proportion of SSIs in India and are considered to be polluting in nature, thereby causing adverse impact on the environment and also on human health. Many of these are naturally located in the form of clusters and are in the traditional sector. Limited empirical evidence indicates that environmental awareness among entrepreneurs of different industries including small industry clusters in Howrah is rather poor and therefore, they have not initiated any joint action voluntarily for pollution abatement. It is either due to the pressure of legal action or offer of external assistance or both that industries in the districts and in the country jointly invested to counter environmental pollution. Further, the problem of pollution abatement is not just confined to technology change but has a larger socio-economic dimension. Therefore, the issue of pollution abatement has to be studied and tackled sector wise in the broader economic perspective. Therefore, a reduction in cost of production as well as pollution can be achieved through not only technology shifts but more importantly an improvement in the quality of human resources comprising labour skills and entrepreneurial qualifications. In case of foundry units, we found an inverse relationship between energy consumption and quality of human resource factors. Of course, it is difficult to improve the qualifications of entrepreneurs, but it could be compensated by raising the composition of skilled labour in the total labour force. This would result in benefits in the form of saved energy, which would more than offset the additional cost to be incurred for hiring more skilled labour. The overall outcome will be reduced pollution. As the economic benefits are more than the costs to be incurred, we feel, policy makers should play only an instrumental role in enabling entrepreneurs to go for the required improvements by incurring the necessary costs.

Based on the study following policies can be recommended-

1) First And foremost, it is imperative to strengthen the infrastructure of State Pollution Control Board (WBPCB) in terms of adequate technical personnel. This will enable them to conduct periodic surveys of pollution intensive industries, large as well as small, and to ensure that they adhere to the environmental laws and regulations of the state. If possible, State Pollution Control Board should make use of the services of District Industries Centres and Taluk Industries Centres to ensure that industrial units comply with environmental laws of the country.

2) In pollution intensive industries, new entrepreneurs must be encouraged to go for environmentally sound technologies, wherever feasible.

3) The State Government is keen on developing awareness about environment. Without public participation, formulation and implementation, environmental laws can not achieve the objective of making our country a non polluted environmentally sound one. Well trained, properly motivated and massive educational efforts are needed for the implementation of environmental rules and policies. The regulatory authorities as well as NGOs must conduct awareness programmes through media or camps in a large scale. Coordination between the Department of Environment and other Departments of Government must be ensured for proper implementation of the Rules and Regulations with regard to environment protection.

4) However, it should be clear that in the Howrah industrial cluster, the present concern about environment is an outcome of the western awareness about it and integrated later with our development efforts in an ad hoc manner. So very naturally, the protection of environment were not integrated in a holistic manner. The implementation of environmental legislation was half-hearted and the rules themselves contained many loopholes. So finally, it is necessary to view the role and future of environmental legislations in this perspective.

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