

VIDYASAGAR UNIVERSITY



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INDUSTRIAL POLLUTION

ON

ENVIRONMENTAL STUDIES

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Our field-study team of students
at front of Marine Aquarium, Digba



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Introduction :-

Since the advent of industrial revolution, performances on economic indicators alone have been used as the principle criteria for measuring progress. Consequently, Introduction of liberalization measures in 1991 further eased the entry of private and foreign investment & technology in industrial sector. However, rapid industrialization carried with it the seeds of environmental damage. Industrial pollution is one of the most evident environmental problems experienced by now industrialized countries and majority of the newly industrializing economies are facing it today. Industrial pollution and waste encompass the full range of materials generated by industrial activities that are unwanted by the producer. At times, they represent an unrealized opportunity to improve production efficiency and reduce disposal costs. Certain components of industrial pollution and waste are hazardous to human health and the environment. Pollution of natural environment not only affects people but also have adverse impact on economic growth in the long run. Analysis of pollution load shows that there are few industries which contribute to more than 90 percent of the pollution in the country during 1990-2020. So, there is an urgent need on the part of policy makers to give top most priority for controlling pollution in these industries which will help in reducing industrial pollution to a great extent.

Our industrial structure has gone through various changes especially since the economic reforms. However, in India no major environmental reforms were initiated to take into consideration. Therefore, there is a need for analyzing the environmental impacts of industrial sector in India. Since different industries have different pollution intensity, this paper tries to have a look at the compositions of industrial structure in India. Then using Industrial pollution projection (IPPS) model of World Bank for calculating pollution load in developing countries where continuous industrial pollution data is not available, we have calculated the changes in the pollution load of Indian industries. Finally, we have concluded by pointing out of the policy reforms that are needed to encourage more efficient use of resource, substituting scarce resources by renewable ones and pollution adoption of technologies and practices that minimize environment impact.

OBJECTIVES:

The paper has been written with the following objectives:

1. To analyze the changes that has occurred in Indian industrial sector since 1991.
 2. To estimate industrial pollution load in India using the world Bank Industrial pollution projection system (IPPS) data base and identify critical industrial sectors for the immediate attention of regular. So that priorities for enforcement of environmental regulation are set.
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9. DATABASE AND RESEARCH METHODOLOGY

Data for this paper has been collected from Annual survey of Industries and world Bank publications on IPPS. Apart from this several papers on industrial pollution which are based on the use of IPPS are also studied.

Pollution load has been calculated using IPPS of world Bank since in India year wise estimates on pollution level at industries level is not available even now. The IPPS is a modelling system which merges the US Environment protection Agency (EPA) data on pollution emissions and the Longitudinal Research Data Base (LRD) on Industrial activity at the plant level to calculate pollution intensity of industrial sectors. Pollution intensity is defined as the level of pollution discharge/emissions per unit of manufacturing activity is very important. For particular sectors such as wood pulping, average pollution intensity is likely to be higher in developing countries. However, the pattern of sectoral intensity rankings may be similar. For example, wood pulping will be more water pollution-intensive than apparel manufacture in every country. The present version of IPPS can therefore be useful as a guide to probable pollution problems, even if exact estimates are not possible.

The IPPS database provides estimates for three alternative measures of the level of manufacturing activity, viz. value of output, value added and employment. Heltige et al. (1999) has shown that in the case of US, the ranking of industrial sectors by their pollution load is almost identical, irrespective of whether the value of output or employment is used as the unit of measurement. Total value of output was, however, judge superior to value added because the energy and materials inputs are critical in the determination of industrial pollution. Since pollution load is given in US dollars, it is converted into Indian rupees using purchasing power parity of dollars for rupees in 1987-88 and then applied to deflated data of value of output of manufacturing sector given in ASI.

BRIEF REVIEW OF LITERATURE :~

Results from the IPPS database have been used in various studies where firm level data on environmental parameters does not exist. Frickmann Young (2000) [2] employed input-output techniques to estimate industrial emissions from export oriented activities in Brazil during the period 1985-96. This was done to know the impact of shift towards export economy on the pollution level in the country. Water pollution parameters like BOD and heavy metals and air polluting parameters like particulate matter, SO_2 , NO_x and HC were measured using Industrial Pollution Projection System whereas, CO_2 emission data was taken from Brazilian Greenhouse Gases Inventory. Both groups of data indicate that export activities thus, showing the negative impact of export liberalization on environmental in developing countries like Brazil.

Sunil K. Sinha [10] in his paper has made an effort to measure the magnitude of industrial pollution in post-reform period. He has used the technique of industrial pollution projection system of world Bank. This technique is designed for measuring industrial pollution load in developing countries where environmental data is not available. Share of highly polluting industries in terms of output and value added has increased in post reform period. Accordingly, air, water and land pollution from manufacturing industries has increased by whooping 200 percent during 1990-91 to 2005-06. This is due to the fact that industrial policies so far has failed to take into consideration the rising problem of industrial pollution.

Rita Pandey (2005) [7] in her study of 17 highly polluting or "red category" industries of India for the year 1999-95, has used Industrial Pollution projection system of world Bank and related abatement cost coefficients to differentiate industries on pollution level and its abatement costs.

She is of the view that for effective pollution control strategy there is need for concentrating on industries which are highly polluting but has low abatement costs. She also favours the use of market based instrument in place of command and control type mechanism for efficient pollution control mechanism.

Oketola and Oladela (2011) [1] has compared industrial pollution loads of 14 industries of Lagos.

(Nigeria). Calculation was done by using Industrial Pollution Projection System to employment and total output, with conventionally analyzed effluent pollution loads. The data was validated statistically using t-test at 95% confidence interval (2-tailed) and analysis of variance (ANOVA) to ascertain if there is any significant difference between IPPS pollution loads with respect to employment & total output and pollution loads from conventional effluent analysis. They found that there is no significant difference between the pollution loads estimated with respect to the two variables in all the industries except basic industrial gas manufacturing where the two means are significantly different. IPPS pollution loads also

compared favourably with pollution loads from conventional effluent analysis at this limit. Seeing the result, they are of the view that JPPS technique provides a cheap way for estimating pollution load in developing countries. It will enhance industrial pollution control in the developing countries where funding for environmental protection is inadequate. The effectiveness of the intervening measures would significantly reduce the overall industrial pollution.

Most of the studies have used only one or two mediums of pollution to estimate industrial pollution and has concentrated on only few industries. Apart from this they did not provide comparison of industrial pollution at different different periods of time and did not include latest data on the variables. This study throws light on the state of industrial pollution at different periods of time including recent data and it covers all the major industries at two digit level.

INDUSTRIAL STRUCTURE AND INDUSTRIAL POLLUTION IN INDIA :-

1. Structural composition of Indian industrial sector

Industrial structural composition is one of the main determinants of pollution in any country. Liberalization has changed the structure of Indian industrial sector. On the basis of this we can analyze whether domestic manufacturing production has moved towards more pollution intensive industries as compared to less polluting industries. Industrial structure is being analyzed on the basis of four parameters type of industries, total employment, total output and net value added.

a) Red category (more polluting industries)

Table 1 clearly reveals that the share of red category industries has gone up on all the three indicators of industrial performance. In total persons engaged and value of final output of this category of industries has increased. However, a slight decline of around 1 percent was seen in percentage of red category industries between

2000-01 and 2010-11, on these two parameters. In terms of total value of output and net value added, red category industries got past to orange category industries with a very slight margin to become the largest fragment among the manufacturing industries. Share of rubber, petroleum, plastic and coal has shown highest increase in terms of value of output and NVA during 1990-91 to 2010-11. While in terms of employment its share has declined. On this parameter, chemical and chemical products have shown highest increase in the period concerned. A steep jump in net value addition in case of red category industries during 2000-01 to 2010-11 is reflective of the fact that these industries have taken least care for the environmental issues and made modest expense to control the pollution.

b) Orange Category industries (somewhat polluting)

This category is largest employment provider which is not surprising considering the inclusion of textile industries which is highly labour intensive. Textile industries showed highest gain on all the three parameters. On the other hand food & beverages group which is the highest provider of employment among all the categories saw a drop in its share from 19.9 percent in 1990-91 to 16 percent in 2010-11. This is true with respect to other parameters.



orange category industries
(Industrial pollution)

In terms of value of output and net value added, share of orange category industry is only slightly lower than that of red category. In fact in terms of value of output in orange category shows an addition of 9.2 percent during the period concerned as compared to 1.8 percent by red category industries.

c) Green category industries (less polluting industries)

Share of Green category industries has shown a decline on all the parameters in the post-reform period as compared to pre-reform period. Highest decline is in the net value added by these industries which registered a fall of 38.9 percent between 1990-91 and 2010-11. Its contribution declined from 28.25 to 17.83 in the period concerned.

In 1990-91, 31.72 percent of the total persons engaged in the manufacturing sector covered under ASI, were working in green category industries.

This has fallen by more than 9 percent points to 22.39 percent in 2010-11.



Green Category Industries pollutions

Contribution of this category in terms of value of output has also decreased in the period under study and has come down from 20.9 percent to 19.9 percent. Although situation improved between 2000 and 2010 as we observed more than 50 percent increase in the share of these industries in terms of value of output.

2. Pollution load of Indian industries

In order to gain some further insight on the level of industrial pollution in India in the aftermath of economic reforms we have calculated the pollution load of different industries using IPPS of World Bank. The IPPS of World Bank data has been used because of the fact that in India, reliable information on the nature and level of emissions by industries/factories is not available.

Pollution load is calculated using the value of output as the parameter for industrial activity. The relative contribution of each industry to pollution load depends on three parameters - air, water, and toxic pollution. The details at the all India level presented total pollution load from manufacturing sector in India has no doubt increased in the period concerned. However, the point is that it increased more rapidly in the post reform period. During 1990-2000, ten years after



Industrial pollution



Pollution load of Indian industri-
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rapidly after the reform, total pollution load nearly doubled but in the subsequent decade it tripled.

Basic metal is the highest water polluting industry throughout the period taken, followed by chemicals and food products. However, we can see that in 2010 chemical slipped to fourth position and other manufacturing categories has taken the second spot.

If we carefully look at the data on pollution load we can see that there are only few industries which contribute to most of the industrial pollution. These industries are chemicals, basic metals, non-metallic minerals, rubber, petroleum & coal products, food & beverages and other manufacturing industries. In comparison to 1990, share of chemicals has declined on all the three indicators in 2010, whereas, that of basic metals has increased in water pollution category, slightly declined in air pollution and, remained almost similar in toxic pollution. Chemicals, basic metals, non-metallic minerals, rubber, petroleum & coal products, food & beverages and other manufacturing industries taken together contributed to 93 percent of total pollution in the country in 1990, 92 percent in 2000 and 93 percent in 2010.

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Sujata Giri
Signature of student